ELP
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NEWS IN PERSPECTIVE

ECONOMIC CLIMATE

IMPROVING ECONOMY is in sight, but things may get a little worse before they improve. The downtrend is likely to be protracted but very moderate. At its worst, the level of business will remain at a height that would have been praiseworthy some years ago.

UNEMPLOYMENT is a big problem, possibly the largest single drag on the economy. Pressures of competition--particularly from abroad--are keeping American firms eager to cut their employment, producing as much or more with a smaller labor force. The number of people available for work, however, is still growing. A strong possibility that unemployment will move significantly above 5-million during the winter can be counted on to spur government intervention and efforts to create new jobs. In fact, this has already started. The Defense Department has sharply increased the speed at which it is placing contracts. The incoming Administration's clear statements that more money will be devoted to defense purchases of complex new weapons will give even more impetus to this trend.

FORWARD BUYING will continue to be held to a minimum, according to the National Association of Purchasing Agents. Purchases are being made hand-to-mouth, on the basis of known production schedules. "Adequate inventories and ready availability of goods are further deterrents to speculative buying in the face of present business conditions," the group asserts.

PRESSURE FOR EXPANSION by the electric utilities will continue through 1961, Economic Adviser Peter B. B. Andrews told the NEMA GT&D division meeting last month. His prediction for sales of equipment to utilities: slightly ahead of the '60 volume, with the year starting slowly but winding up on "a high note of record prosperity."

MANAGEMENT VIEW

THE OUTLOOK: NOT SO DARK as defeated Republican supporters saw it the morning after . . . and for the victorious Dems: not so bright, perhaps. This generalized view of what can happen in Washington over the next four years (expressed by TV Commentator Walter Cronkite) comes as close as any to summing up the post-election reaction. Only the most die-hard Dems would claim a strong mandate for Sen. Kennedy; on the other hand, not so many of even the stauncher Republicans would expect to be confronted with all the dire prospects anticipated by an extremist like Sen. Goldwater. Yet, post-election, Sen. Goldwater's pre-election remarks re the electric power industry call for re-reading (see p. 46) . . . and action along the lines he defines so ably.

POST-ELECTION FINANCING for utilities was markedly heavy. Utility stock activity, however, failed to indicate any measurable pattern as a reflection of election results, though some observers reported signs of investor caution. Irving Trust offers these estimates of the electric utility financing picture: (a) a probable easing of corporate demands for long-term funds, following a "topping out" of plant and equipment expenditures in general industry; (b) financing for 1960 to total about $1.7-billion, down some from earlier estimates; (c) 1961 construction to rise slightly (about 1-percent) . . . and 1961 financing to increase by about 3-percent.

A WELL-BALANCED TEAM in utility management might have an average age of 50, Puget Sound P. & L. Co.'s Pres. J. H. Clawson proposes. In his recent presentation for the N.Y. Society of Security Analysts, Mr. Clawson referred proudly to "the top management group (which) over the past five years has acquired new talents through the arrival of several men with broad utility and professional background experience"--averaging 24 years a man in the utility field. Age range is 41-61, with the average for the group exactly 50.

COMPUTER WINS SUPPORT--Iowa G. & E. is the most recent utility company to arrive at an answer to the now-common question: Will electronic data-processing equipment pay? A study by Arthur Andersen & Co. produced justification for employing a medium-scale computer, following a 2-year period of preparation by a 14-man team for the transition in 1963.

ATOM IN YOUR TOWN?--This month it became a bit more welcome, via "Citizen Atom," the "New York Times" Sunday supplement, arranged by General Electric. The impact of reprint distribution (with orders still acceptable to Jan. 1) is certain to be sizeable, since over 600,000 copies had already been ordered by a score of utility companies as of Nov. 25.

POLICY ON "MOONLIGHTING"? You should have one, as clear-cut as the union. This is the recommendation of an author whose review of this subject was published recently in the AMA's Personnel magazine. The work-week of the future is certain to have shorter hours, which will bring an increase in moonlighting--a "new problem" calling for new answers, according to Alan C. Filley, instructor at Ohio State U.

WASHINGTON INFLUENCE

PUBLIC POWER will clearly get a boost from the Kennedy Administration. The Eisenhower partnership policy is moribund, if not yet dead. Best chance for continuation of this policy comes from the fact that defense expenditures are going to grow. This may put a premium on saving federal funds in other ways--and partnership clearly reduces federal outlays. But it can be assumed that big modifications would be made in the program and that nothing will be done that does not meet the desires of public power advocates. Investor-owned utilities will, at best, be given a back seat in the development of new power sites. Odds are that a strong push will be made in Congress for future planning on a river-basin-wide level, and it has a fairly good chance of enactment. REA loan policy, of course, will soften and there will be no upward change in the REA interest rate.

TVA FINANCING AND EXPANSION is almost certain to be brought up again in Congress. Rep. Ben F. Jensen (R., Iowa), member of the House Appropriations Committee, has pledged to continue his fight for the "restoration of proper congressional control over the operations of the socialistic TVA power empire." TVA Board Chairman Herbert D. Vogel, right before the first sale of $50 million TVA bonds, forecast a need for $150-million to $200-million each year over the next seven years. About one-third could come from internal sources, but the rest would have to be borrowed.

INJUNCTION AGAINST TVA is sought by Kentucky Utilities Co. The power company wants TVA to refrain from supplying power to a new plant which, it claims, is outside the Congressionally-set limit on the public power agency's territory. Kentucky Utilities claims it will lose significant revenue if TVA can serve this customer. This is believed to be the first suit filed to enforce the limitation on TVA's service area passed by Congress last year.

FLOOD LOSS POTENTIAL by 1980 could reach nearly $1-billion a year in the country's major flood areas, warn the Army Engineers, but the huge figure can be significantly reduced by effective Federal, State, and local efforts. The present loss is around $700-million a year. The possible annual loss of $980-million in 20 years could be cut to $483-million a year if (1) the $5-billion in projects now underway or authorized but not started were completed and (2) if an additional $6.5-billion in new projects were built. A report submitted to the

NEWS IN PERSPECTIVE

Senate Select Committee on Water Resources estimates that the present $300-million-per-year construction rate for flood control works exclusive of multiple-purpose projects would have to be raised to $500-million per year by 1970 and held at that for a decade. One recommendation made by the Engineers is amending basic legislation to reflect more fully comprehensive and coordinated programs for major river basins.

BURNS CREEK PROJECT could do much to alleviate drought in Idaho, according to Reclamation Commissioner Floyd E. Dominy. The drought may, however, impress on Congress the need for speedy authorization of the project. An Army Engineers report, Dominy says, will examine the unused resources of the Upper Snake River Basin--estimated at 80 possible sites for development, including about 20 hydro plants for generating 1.24-million kw.

SWPA AUDIT for fiscal 1959 shows a loss of more than $40-million from power operations through that year. The Corps of Engineers' nine dams and SWPA installations have capacity of 601,000-kw at a power investment of $445-million. Operating expenses in fiscal 1959 (other than interest) ran $568,000 over operating revenues. Actual loss is figured at over $5.7-million. By year's end, deficiencies in repayment schedules were more than $26.5-million--about half attributable to excess operating expense and half to failure to earn depreciation and repayments.

Accounting procedures of SWPA have been cited as defective by the U. S. Comptroller General. Certain substantial costs properly allocable to power--particularly amortization of items like land cost, relocation, and rights-of-way--are not correctly carried on the books. Other losses stem from SWPA's contracts with G&T coops.

BIG REA LOANS have been granted in Nebraska and Arkansas. Norris Public Power District in Beatrice will use $2,276,000 mostly for substations and high voltage line. Eastern Nebraska PPD, Syracuse, will use its $1,981,000 for transmission. Another G&T loan for $1,226,000 went to Woodruff Electric Coop Corp., Forrest City, Ark.

MONTANA POWER'S compensation to the Flathead Indians--set last year by FPC at $50,000 annually retroactive to 1954 after the Kerr hydro project's operation --remained unchanged. Hearing Examiner Edward B. Marsh after a rehearing declared that the Interior Department's contention that the payments be raised was not valid. However, the examiner noted that a new issue raised "involved an intergovernmental jurisdictional policy question which would be inappropriately ruled upon at the hearing examiner level." That question--whether Interior must approve the amendment to Montana Power's license for the Kerr project before FPC can decide payments to the Indians--is presently before an appellate court.

PRDC LOWER COURT DECISION has been granted review by the Supreme Court. If the High Court upholds the rule that fuller safety findings must be made before AEC can grant a construction permit, then private industry and the Commission foresee great delays in the development of A-power by private industry. If AEC policy is upheld, then eight big reactor projects will be freer to proceed.

FPC RULE CHANGE would limit recesses and postponements of hearings to periods of not more than 30 days unless approved by the Commission.

NO CONTEST PLEAS permitted by Fed. Judge Ganey in the Government's criminal price-fixing cases against electrical equipment manufacturers appeared to be a fortunate out, of a sort, for all parties. At any rate, there are obvious advantages to defendants in avoidance of a long court battle, tremendous legal and court costs and further adverse publicity; and, the Justice Dept. officials also preferred this manner of settlement to the small chances for conviction which could be expected after prolonged trial actions. And, by admitting to the facts of the case without conceding formal guilt, defendants minimize effects of the charges on contract and other customer relations.

NEWS IN PERSPECTIVE

ELECTRICAL EQUIPMENT IMPORTS, involving generating units of over 10,000-kw capacity, do not pose a threat to national security, OCDM has decided. Main finding of the agency's investigation: little has been imported to date . . . and little reliance (at least by Government) is placed on foreign equipment sources.

INDUSTRY SIFTINGS

EQUIPMENT MAKERS' PRESTIGE needs a boost, the Generation, Transmission and Distribution Equipment division of NEMA decided last month in its first annual meeting under the Association's re-organization. Setting up a new public relations group to tackle this objective, the division aims to reach customers and the public with a "vigorous" program. The GT&D division also took steps to increase customer (and particularly utility) understanding of (1) the foreign import problem and (2) the importance of equipment standardization work.

R & D INVESTMENT OF $4-BILLION by the electrical industry in 1960 should have added some to manufacturer prestige. But, in any case, results--in terms of profitable new products--amply justify the investment, four of the industry's top scientists assured NEMA members in their recent annual meeting. This whopping investment, they noted, tops the R & D outlay of all the rest of the nation's industries combined. (From it, too, comes the kind of "vigorous technological offensive" that is this country's best long-range defense against foreign competition, the National Foreign Trade Council was advised by GE's Chairman Cordiner.)

GET DEFIBRILLATOR FACILITY set up in one or more hospitals on your system, Dr. Kouwenhoven urged EEI Accident Prevention Committee members in conference last month. While portable units may become available early in '61, provision for standby sources in local hospitals is the best safeguard for effective shock accident treatment, the Johns Hopkins expert argued.

MOTOR VEHICLE PAINT COLOR most dominant today is orange-to-yellow. Reporting to the EEI safety group on trends in vehicle painting, Western Massachusetts Elect. Co.'s Eugene H. Wessells, Jr. noted that in the past several years the traditional green of yesteryear had been abandoned by some 20 electric companies across the country. Their new choice was in the yellow and orange range.

L.A.-PASADENA NUCLEAR PLANT will include a 50-megawatt Improved Cycle Boiling Water Reactor prototype, to be built by Allis-Chalmers for $10.7-million (bid price, subject to negotiation).

LOCAL ELECTRIC UTILITIES WON in three separate election-day actions, reports the Electric Companies Public Information Program (PIP). In one Washington county (Asotin) 77-percent of the voters rejected the formation of a PUD in their county; in another Washington county (Thurston) voters elected a new PUD chairman opposed to condemning investor-owned electric utility properties within the district; in the town of Greenfield, Ohio, voters favored selling the municipal's electric properties to the Dayton P. & L. Co.

BIG BOOST FOR ELECTRIC AUTO came in recent study report on future transport needs by the National Academy of Sciences. Noting that the total energy used by all motor vehicles in the U. S. is about equal to central station electric energy output, NAS proposed that heavy use of electrically-powered personal cars would ease the strain on petroleum reserves and help meet the menace of smog and air pollution.

PACKAGE POWERPLANTS FOR $100/KW are now available from GE, which has already sold four of the gasturbine units to South Carolina Electric & Gas Co.

LIGHTING LEASE PLAN of Westinghouse, announced in EL&P, Nov. 1, p. 10, may cover installation costs up to 50-percent of the selling price of the lighting equipment involved (not 5-percent, as incorrectly noted earlier). Westinghouse reports that the plan has been extended to include outdoor as well as interior products, "in this the broadest line of lighting equipment of any one manufacturer in the industry."

EEI Power Survey:

Low Manufacturing Backlogs Persist

Succeeding again this year in boosting the nation's electric generating capability by more than 7-percent over the previous year, the electric utility industry will once more wind up the year with a dropoff from the preceding year in the total capacity of generating equipment received in shipments from domestic manufacturers.

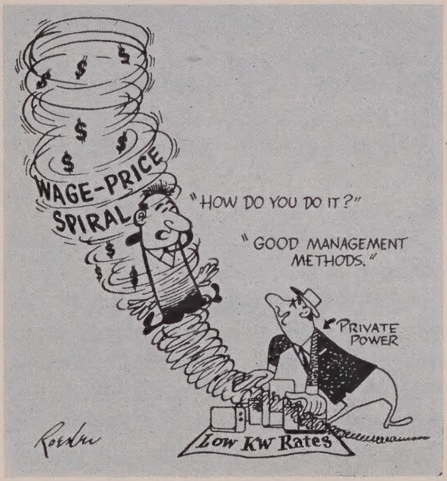
The year's schedule of shipments, according to EEI's 28th Semi-Annual Electric Power Survey released last month, amounts to only 71-percent of the annual production in the record year of 1958. And, it now appears probable that the decline will continue in 1961, since production now scheduled for next year is less than the 1960 schedule. The present schedule for 1962 and later years combined is slightly more than the 1960 schedule.

The EEI Survey also reveals these additional facts:

1. The order backlog for steam turbine-generator manufacture continues to decrease, with the total reported in this Survey being the lowest reported at the end of any quarter during the past ten years, with single exception of the backlog held at the end of the third quarter of 1954.

2. The capacity total of generators for hydraulic turbines in 1960 exceeds by almost 33-percent the previous record production of 1958; and the scheduled production of hydraulic turbines slated for shipment in 1961 is expected to equal the total shipped in 1958, or about 85-percent of the record-high production of over 4-million hp in 1959.

3. Shipments of power transformers in 1960 is expected to total about 51-million kva, up over both '58 and '59; but, the estimated full manufacturing capacity for power transformers remains at the much higher figure of some 80-million kva per year.



"One of the reasons electric utilities have been able to expand their net earnings so remarkably over the past 10 years is their avoidance of the cost-price squeeze that haunts many other industries," an investment firm pointed out recently, noting this record: Since 1950, the operating ratio (percentage of fuel, wages, maintenance and operating costs to revenues) has dropped steadily from 47.9% to 42.3%.

The industry's generating capability increase of 12.6-million kilowatts in 1960 will boost the nation's total capability to 175.9-million kilowatts—up 7.7-percent from a year earlier. With expansion proceeding at an average annual rate of more than 7-percent, total capability at the end of 1963 is scheduled to reach 211-million kilowatts. In 1963, the gross margin of power supply over demand is expected to be 25-percent.

Survey Committee Chairman Arthur S. Griswold, vice-president of The Detroit Edison Company, points out that according to present forecasts, the December, 1960, peak load for the total electric utility industry will reach 137-million kilowatts—9.4-percent over last year's December peak.

In 1963, for the first time, summer and winter peak loads are expected to be equal: 169-million kilowatts.

Southern California Edison Reports

Operating Efficiency Gains Save Millions

A bold program of greater manpower utilization and plant efficiency at Southern California Edison Company is producing cost reductions totaling many millions of dollars, the Security Analyst Society of San Francisco was told recently.

Harold Quinton, Southern California Edison board chairman, reported on several areas of his company's operation in which substantial economies are being realized. As an example of the economies which the Edison Company has effected, he cited recent gains made in the company's steam generating division:

"By using larger units and centralized control, along with improved utilization of manpower, we have been able to reduce the number of employees some 10-percent since 1955, although steam generation has increased almost 100-percent," Mr. Quinton said. "This has resulted in a savings of about $4.3-million annually." (He emphasized, however, that the reduction in employees has been accomplished by a slow-down in hiring rather than layoffs.)

Another example of achieving significant economies is in Edison's commercial department where, Mr. Quinton said, "we had for many years used a yardstick of one employee per 1,000 meters. By first switching to punch-card billing and centralized accounting and then establishing better work standards and better measurement methods, we have lowered this yardstick to .68 employee per 1,000 meters, resulting in a net reduction of 272 employees while adding hundreds

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of thousands of new meters.

"There are collateral savings, as well, in this department, the total projected annual operating savings running up to several million dollars," he said.

The utility executive predicted that year-end earnings would run "close to $3.95 and possibly exceed that figure slightly.

"The use of 'flow-through' with accelerated depreciation will add about $.50 per share, or a total of $4.40 to $4.45, but at the expense of possible higher future taxes which can result in later years due to the acceleration of depreciation when it makes its regular review of the common stock dividend."

He predicted that the board will continue its pay-out ratio policy of approximately 70-percent while considering the business outlook in 1961 and '62 as well as the company's necessarily heavy cash requirements to keep up with continuing growth. If an increase in dividends is determined at all, he said, "it will be suggested to the board that they examine the desirability of an extra dividend payable in common stock rather than cash."

Mr. Quinton said that in the seven years since his last appearance before the San Francisco security analysts the Southern California utility system has more than doubled in size, both in dollars of plant investment and in generating capacity to handle the more than 560,000 new meters added, plus the overall increased usage per meter. Southern California Edison's service area continues to absorb an average of about 200,000 people annually and, in this connection, Mr. Quinton noted that the population increase over the past 10 years in the United States was 19-percent, in California, 49-percent, and in Southern California Edison service territory, 79-percent.

He said that the company's long-term financing has been completed for 1960 after the offering of two bond issues, totaling $90-million in January and August. The company's construction budget for 1961 is presently estimated at about $130-million, about half of which will be provided with funds generated internally.

"The form of securities to be used for the remainder is still in doubt, although I believe our capital structure is sufficiently in balance to absorb another bond issue before additional equity would be necessary," Mr. Quinton explained.

Pres. Reeves Tells Analysts

New Mexico P. S. Plans Permanent Financing

How does the management of a utility which "expects the area we serve to continue to grow at a much more rapid rate than the rest of the country" plan and present its corporate image to the financial community?

Public Service of New Mexico is that kind of utility, and the recent presentation of its president, D. W. Reeves, to the N. Y. Society of Security Analysts offers a good example of such a management position.

Mr. Reeves reported that his company's recently completed construction budget for 1961 totalled $13,175,314, with a total estimated budget for 1961-1965 of $60,888,236. During these five years, he noted, the utility expects its plant account to increase to about $148-million, or by 70-percent.

Mr. Reeves referred to the company's earnings picture this way:

"Rightly or wrongly it has been our policy never to release any estimates as to future earnings per share. I can say, however, that we are going to do our utmost and we fully expected to maintain a satisfactory rate of return and satisfactory earnings. As I said before, if it should become necessary in order to maintain a satisfactory rate of return, we will not hesitate to seek rate relief.

"While maintaining our allowed rate of return we have been able to maintain rates for electric service generally lower than those charged by REAs and government-owned systems in the state and comparable to the rates of other investor-owned utilities operating in the state.

"The final measure of the results of any company, so far as the common stockholder is concerned, is the net available to the common stock, the earnings per share of common stock and the dividends declared. The net available to our common stockholders will increase from $974,384 in 1950 to approximately $3,290,204 in 1960 or 237.7-percent.

"The earnings per share of common stock will increase from $0.80 in 1950 to approximately $1.60 in 1960, making the current annual dividend twice that in effect in 1950. Taking into account the 5-percent stock dividend in 1958, the comparable rate would be $1.05 in 1960 compared to $0.50 or an increase of 2.1-times.

"Under existing conditions we believe that the long term debt of our company should not exceed 55-percent or less within a short period of time. We also believe the common stock equity should be 30-percent or more. It would follow that the preferred stock should not exceed 15-percent of the total capitalization. In our opinion, these percentages should be regarded as guidelines. We also believe some variations might become desirable with changing conditions.

"In view of the $13,174,000 construction budget for 1961 and current bank indebtedness of $5,000,000, it is evident that we should do some permanent financing late this year or early next year. Since our current debt ratio of 50.3-percent and unpledged bondable property will total about $26,400,000 at December 31, 1960, the company is in excellent position to undertake the necessary financing.

"Currently we contemplate issuing about $12,000,000 in first mortgage bonds which will be used to pay off outstanding bank loans and provide cash for the construction program through August 31, 1961. Warrants for the purchase of common stock were attached to the 1959 series preferred stock. These warrants provided for an increase in the exercise price of $2.50 on July 1, 1961. Full exercise of warrants outstanding on September 30, 1960 prior to the increase in price would provide $4,881,000. If the warrants are not exercised, we would expect to use bank financing for a short period and undertake financing which would fit in generally with our ideas on the proper capital structure in late 1961 or early 1962," concluded Mr. Reeves.

Frontiers of science and present-day research leading to them were explored recently by 350 high school students and 250 science teachers who participated in the Second Annual Youth Conference on the Atom, held in Chicago. Sponsored by investor-owned utilities of the nation, conferees came from 38 states. Visits were made to Argonne National Laboratory and Dresden Station. Talks, as well as audience-participation (like questioning above), were on a scientific, rather than a popular level. At right (seated with Bozell & Jacobs' Colin MacLachlan), Pennsylvania P. & L.'s Jack K. Busby, who was utilities' host-representative, describes Conference and its purpose for "Voice-of-America" broadcast.

Dresden Plant Costs: Firm Picture by 1967

Good operating costs figures on Commonwealth Edison's Dresden nuclear power station are not expected to become available until 1967, the utility's Vice-President Gordon R. Corey, recently indicated in response to a question from a Wall Street investment house.

Meanwhile, Mr. Corey conceded, "about all I can do is talk in generalities" regarding investment and operating costs associated with Dresden. In a letter reply to G. Leslie Fabian of Dean Witter & Co., the Commonwealth executive offered the following information:

"We still expect that the cost of power from Dresden Station (excluding the research and development costs) will eventually be in the 7½-mill range. However, we believe that today, including carrying charges, it is well in excess of the 7½-mill figure.

"When the plant was ordered in 1955, we hoped that the cost of power from Dresden Station (excluding the research and development costs, which have been substantially written off) would eventually be competitive with electricity produced from conventional steam plants then being planned. The cost of electricity so produced was approximately 7½-mills per kilowatthour based on a 60-percent capacity factor and reflecting all carrying charges on a level premium basis over the life of the plant—approximately 3-mills for fuel and 4½-mills for carrying charges and other operating costs. Costs on conventional plants we are planning now are in the 6½ to 7-mill range.

"As to the investment costs of Dresden, we can be fairly definite," Mr. Cory said. "The station was built by General Electric Company at a contract price of $45,000,000. Of this amount, Commonwealth Edison Company paid and capitalized on its books $30,000,000. The remaining $15,000,000 was contributed by Commonwealth Edison Company ($2,833,000) and its seven partners in the Nuclear Power Group: American Electric Power Service Corporation, Bechtel Corporation, Central Illinois Light Company, Illinois Power Company, Kansas City Power & Light Company, Pacific Gas and Electric Company, and Union Electric Company. The $15,000,000 so contributed was treated as research and development expense for federal income tax purposes, and will be entirely written off by the end of 1960. In addition to the $30,000,000 contract price which Edison capitalized, an additional amount of approximately $6,000,000 representing land and overhead costs, will also be capitalized on Edison's books. Moreover, our investment in the first load of fuel and the inventories of fuel on hand amounts to approximately $10,000,000."

Noting that Dresden has been in regular operation only since last October, Mr. Corey pointed out that it contains one of the largest energy-producing fuel cores ever loaded in a reactor—perhaps the largest. He stated: "As you can well imagine, we have a great deal to learn about how long the fuel bundles will last and what the burn-up costs will be. It will probably take several years for us to obtain reliable cost data.

"The present load of fuel was, of necessity, placed in the reactor all at once, late last year. In the future, however fuel will be discharged and reloaded on a cycle basis. This is the most efficient way to do it. The second generation of fuel will therefore be more efficiently utilized and will produce electricity more cheaply than the first. However, we will not start to load the second generation of fuel into the reactor until 1961, and the last of the second generation will probably not cycle through and be removed until 1967. Thus, it will be several years at least before we can do more than make tentative estimates of the cost of producing electricity at Dresden. By 1967 we hope to be able to give good operating cost figures."

WE LIKE PRIVATE ENTERPRISE
DRESDEN, ILL. ATOMIC POWER PLANT - BUILT AND FINANCED BY PRIVATE ENTERPRISE.
WHAT DID IT COST ME?
"NOT A CENT."
PRIVATE ENTERPRISE
TAX-PAYER
ORR

Well-publicized dedication activities signalling the startup of the Dresden Station near Chicago stressed the significance of the private enterprise investment in the future of nuclear power. Probably the most effective single interpretation of this appeared on the front page of THE CHICAGO TRIBUNE—this cartoon by Orr.

A Conservative Republican Views with Alarm . . . And Hope

A New President, A New Congress:

Arizona's Senator Goldwater, in a pre-election address to the electric utility industry, looked at the power situation this way—

"We have already relinquished more of our freedom than I like to think of . . . We cannot go too much further without the movement toward the welfare state snowballing."

Senator Barry Goldwater, in a pre-election address to the Southeastern Electric Exchange, projected from his well known political philosophy an assessment of the nation's electric power situation as it may be affected by Federal legislation in the months to come.

Now, post-election, with the new combination of the first Democratic administration and Congress in nearly a decade, the conservative leader's evaluation of the investor-owned utility industry's prospects for facing renewed efforts at encroachment takes on added meaning, of course. Here, in excerpt, are the Senator's views with specific regard to government competition and encroachment in electric power supply:

As a member of the Senator Interior and Insular Affairs Committee, I have seen many pieces of legislation introduced, which, if enacted into law would have been very detrimental to your industry. And I might say if all of them were enacted into law it would spell the end of your industry as a free enterprise operation in this country. I can also tell you there are very few of them that would not be favorably reported by the Senate Committee if they were put to a vote. I will further say that they would stand a very good chance of passage, if favorably reported by the Committee. The sense of that legislation introduced was:

That the great quantity of low cost power this nation will require for future growth can only be supplied by substantial Federal Government participation.

That giant power, which is thought of in terms of a national grid connecting giant steam and hydroelectric plants from coast to coast is essential. That in order to have this, the Federal Government must play a prominent role in providing it.

That we must have comprehensive development of all our river systems and that only the Federal Government can carry out such a program.

That we must re-define the criteria for determining feasibility of water development to lower materially present standards so that inferior and higher cost projects can be constructed by federal agencies.

That we must increase the ease of financing federal power projects by establishing the capital budget and by additional revenue bond authorizations.

You will not find all of this spelled out in specific legislation, but I can tell you the objectives were inherent in legislation introduced in the 86th Congress and all of these objectives are spelled out in the 1960 Democratic Party platform.

AFTER THE ELECTION, Sen. Goldwater suggested that his own party might very well ask itself this question: "Did we lose simply because the average voter could not find any important difference between the domestic programs of the two parties?" He criticized a "me-to" attitude of trying to match Democratic promises as being at least partly responsible for the defeat.

The proponents of government power are very industrious; they have a great deal of ingenuity, they miss no bets in promoting ideas that advance their objectives. For years they have used flood control, navigation and irrigation—all legitimate functions of government—to promote additional government power. They tried to use atomic energy for that purpose, but it seems that you people got on top of that problem and took most of their steam out of it. Their latest gimmick is the argument of keeping ahead of Russia. They realize, of course, that the people are very conscious on this subject, with the sputniks, ICBMs, armament and the like under constant discussion, so they have dragged electric power into it.

All of us have some very important decisions to make and the first is—are we going to accept these attacks on your industry or are we going to fight back? If we are going to fight back, how are we going to go about it? Are we going to continue, as in the past, fighting brush fires here and there getting burned a little more by compromise each time a fire breaks out? Or are we going to attack this problem at its roots, which to me is from a standpoint of national policy.

If we are going to continue the first method, we are only prolonging the time it takes to burn out the whole forest—until all of our electric systems are under federal ownership and domination.

If we follow the second course, and I think it is the only sound one, then we had better find out what our national policy is. Of course, national policy should be what a majority of the people want but it does not always work out that way.

Do the people really want government ownership of our electric industry?

Do most of the people believe in tax discrimination between various segments of our citizens?

Do the people believe in preferential treatment of citizens in one area over another?

Do the people believe that the government should compete with its citizens in a business venture?

If the government does compete with its citizens in a business venture, do a majority of the people believe that the government should enjoy unfair tax and cost-of-money advantages?

If the government does enter a business venture, do the people believe that the government should sell its product below cost to a minority segment of its citizens at the

What Does the Electric Power Industry Face? What Can The Industry Do About It?

expense of the majority?

Do the people believe that the government and only the government should develop our natural resources?

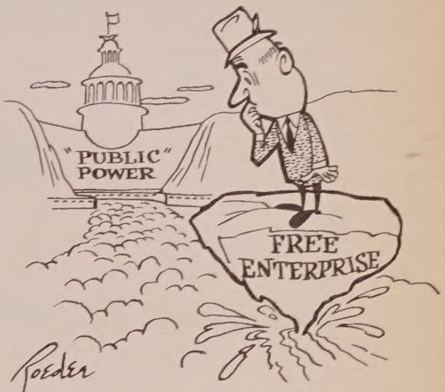
If the answer to the above questions is yes, then we have lost the battle before the fighting begins. If the answer is no, and I am convinced that it is, then we are going to have to look beyond delaying skirmishes and plan a sound aggressive attack.

In planning the attack, it is imperative that we be realistic. You are not going to do away with the TVA and other existing federal power developments. We are not going to gain ground by knock-down-and-drag-out name calling fights with federal power pressure groups. We are not going to divorce the federal government from all water projects that might have some hydroelectric power included. If we attack on the basis of such objectives, we will find ourselves firing blanks.

It seems to me that the first thing to do is establish a firm national policy which clearly delineates between those things the government should do and things it should not do. This must be a realistic determination. We cannot take the position government should do nothing.

A third objective should be the discontinuation of tax discrimination. This should apply to all proprietary operations of any segment of government.

Another step should be toward putting all government proprietary operations on a paying basis. All subsidies should be eliminated. This step should apply to existing as well as future developments. It should also apply to the lending of money.



"ERROSION!"

Another step should be to subject proprietary operations of all segments of government to the same rules and regulations that govern stockholder financed organizations.

When these things are done, and I believe they are do-able, you can quit worrying about government competition and encroachment and get along with the business of supplying this nation with an ample amount of low-cost electricity.

Government in Power Business — What Democratic Candidate, Party Promised

President-elect Kennedy's program in this area, as outlined in his campaign speeches, calls for "dynamic resource development." First is to "reverse the policy of 'no new starts'—not after a study, not after a commission, but immediately in January, 1961—and we are going to move ahead on comprehensive plans for multi-purpose river development." Second is to "devote the benefits of public resources to the public good—and that includes adherence to the preference clause carrying out the principles of Theodore and Franklin Roosevelt." Third is appointment to FPC, the Interior Department, to REA "and to every other agency men who will put the public interest first." Fourth, a Council of Resources and Conservation Advisors would be set up in the Office of the President. Fifth, "more businesslike budget practices" will be used for natural resource projects—"practices which distinguish between capital investment and operating expenditures." Sixth, REA will be restored "to its former role of pre-eminence—freeing it from constant concern over political interference, higher rates of interest, and budgetary starvation.

"Foster the development of efficient giant power systems from all sources including water, tidal and nuclear, to supply low-cost electricity to all retain electric systems, public, private and cooperative.

"Meet the needs of rural electric cooperatives for low-interest loans for distribution, transmission and generation facilities; federal transmission facilities, where appropriate, to provide efficient low-cost power supply; and strict enforcement of the public preference clause in power marketing."

Mr. Kennedy elaborated on his views about rural electrification:

1. Under the next Democratic Administration, the Administrator of REA will apply no political tests to REA loan applications. He will be directed to approve any loan that meets the traditional standards of merit and feasibility developed under the 25-year-old Rural Electrification Act.

2. When first enacted it was clear that Congress intended REA policies to be keyed to economic growth. We must be true to that intention, and work sympathetically with rural electric systems to meet the increasing demands for electricity in rural areas. This means generation and transmission loans when such loans are feasible and will help solve a power shortage or reduce costs.

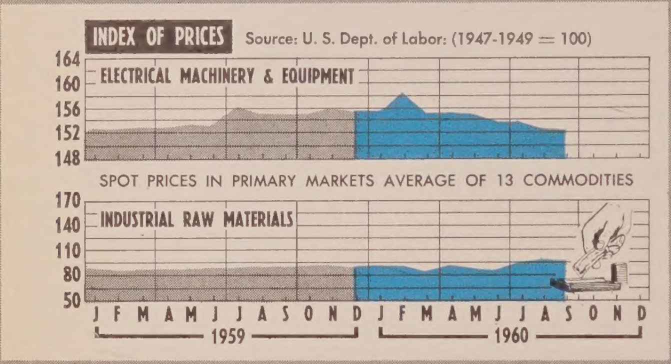
3. In place of the government-led campaigns against the rural electrics there must be a climate of friendly encouragement.

4. REA Co-ops are not socialistic. The funds they receive from the Federal Government are not gifts or subsidies. They are business loans, repayable with interest. Repayments are well ahead of schedule. This is the kind of record we must help implement.

MARKETING GUIDEPOSTS

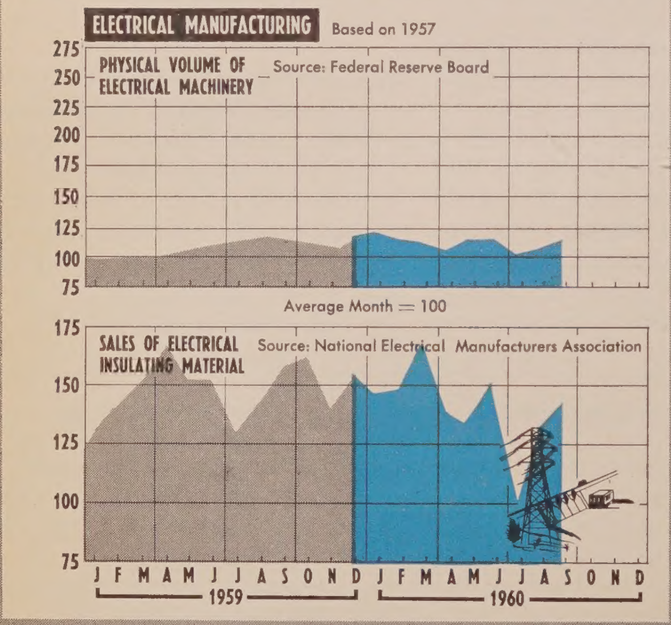
INDEX OF PRICES

Source: U. S. Dept. of Labor: (1947-1949 = 100)



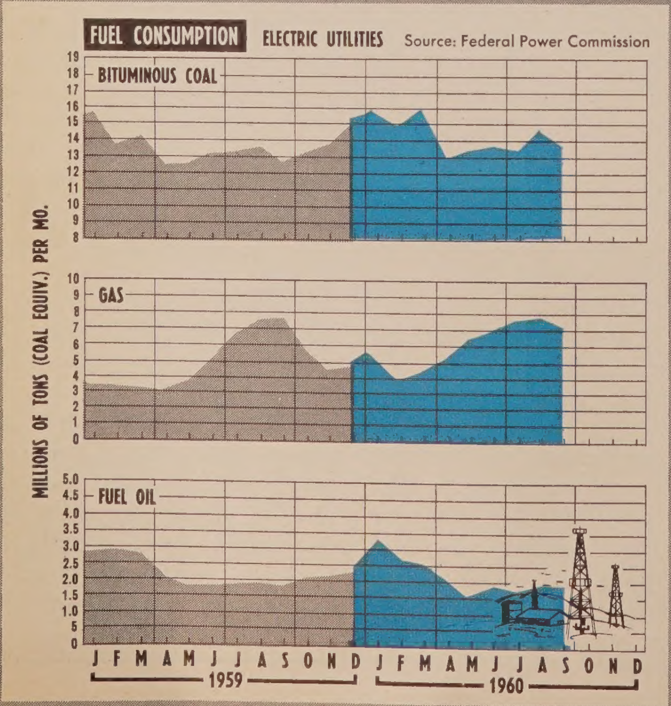
ELECTRICAL MANUFACTURING

Based on 1957

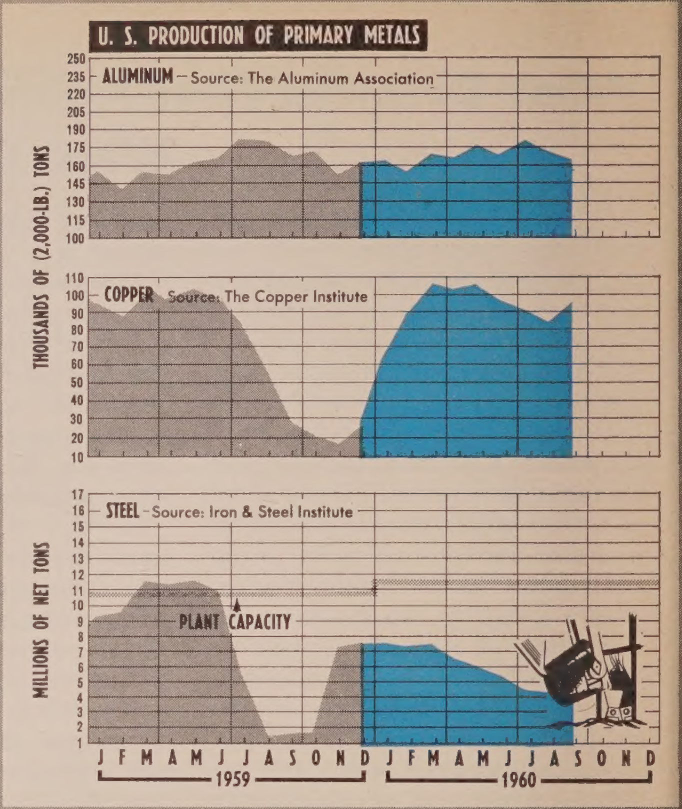


FUEL CONSUMPTION

ELECTRIC UTILITIES Source: Federal Power Commission

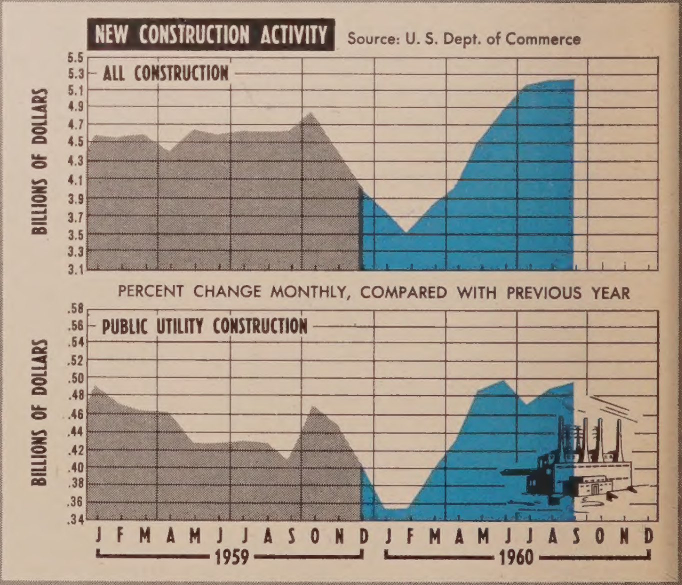


U. S. PRODUCTION OF PRIMARY METALS



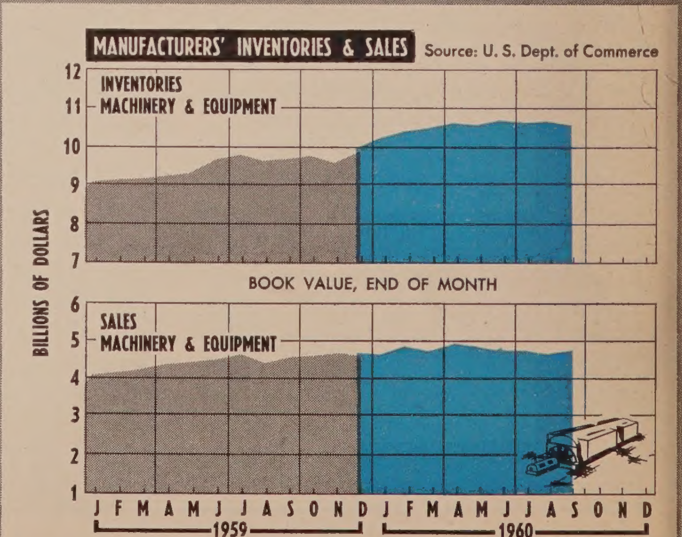
NEW CONSTRUCTION ACTIVITY

Source: U. S. Dept. of Commerce



MANUFACTURERS' INVENTORIES & SALES

Source: U. S. Dept. of Commerce



NUCLEAR NEWS

TRUE COST OF NUCLEAR POWER—When will we know? One recognized U. S. expert, Dr. W. H. Zinn, recently told an IAEA-sponsored discussion group in Vienna that "the operating experience with large-scale plants over *the next two or three years* will be particularly significant in giving answers to the true cost of nuclear power." But, according to Commonwealth Edison V-P Corey (see p. 45), "good operating cost figures (on the first U. S. full-scale station, Dresden) are not expected to become available *until 1967.*"

FUEL ELEMENT OPERATION will figure prominently in the economics, of course. Since Dresden operators will not begin to load the second generation of fuel into the reactor until next year and it will probably not cycle through until 1967, this date is the one picked for producing "good cost figures," by Mr. Corey. Meanwhile, Dr. Zinn in his IAEA remarks suggested that answers might be obtained to such key questions as the failure rate of fuel elements, the ability of plants to continue operating with failed fuel elements . . . and how easy it may be to handle and remove irradiated fuel elements.

FUEL ELEMENT CLADDING for PG&E's Humboldt Bay reactor has not been clearly decided upon, AEC's Hearing Examiner disclosed in authorizing issuance of a construction permit to the California utility. As now planned, the fuel will consist of slightly enriched uranium oxide pellets encased in zircaloy tubing. The AEC's Examiner noted, however, that recent tests and experience with zircaloy in GE's Vallecitos Boiling Water Reactor have indicated "that there may be a tendency in this material for small cladding imperfections to propogate to large cladding breaks in the single fuel segment." Mr. Bond expressed the view that such cladding failures would be an operating nuisance rather than a public hazard . . . and that the choice between zircaloy and stainess steel as the fuel cladding is an economic matter of fuel cycle costs and continuity of plant operation rather than safety.

UNION'S VIEW ON PRDC decision taken by the AEC before the Supreme Court ascribed "decisive significance" to the Commission's "change of position between its initial decision and its final decision." The Unions' counsel, Benjamin C. Sigal, charged that it was incumbent on the Commission that it make a specific finding that the PRDC reactor could be safely operated at the proposed site; but, he said, this the AEC failed to do.

INSURANCE PROTECTION RATES are already high enough, Atomics International V-P W. L. Sequeria has suggested to the Commission, and the AEC should not modify its regulations as proposed by representatives of the insurance industry recently. He pointed out that the insurance industry's suggested formula would raise the cost per kwh from .2-mill to as much as 2.7-mills on reactors operating or under construction. "To saddle the atomic energy industry with such an insurance cost factor at this critical time (when it is pressing toward a healthy competitive equality) may only serve to kill a faltering enthusiasm for the development of atomic energy," he observed.

AT CVNPA GROUNDBREAKING recently, S. C. McMeekin, president of So. Carolina Elect. & Gas was elected president of the Southeast group.

RECENT AND USEFUL READING—Publications of the AEC: *Nuclear Reactors Built, Building, or Planned in the U. S. as of June 30, 1960* (TID-8200, 2nd Rev.), 23 pages, available from AEC-TIE, P. O. Box 52, Oak Ridge, Tenn., and the following, all available from U. S. Dept. of Commerce, OTS, Wash. 25, D. C.: *A Compendium of Information for Use in Controlling Radiation Emergencies* (TID-8206, Rev.), $1 a copy; *Fossil Fuels in the Future* (TID-8209), $0.75 a copy; *Energy from Uranium and Coal Reserves* (TID-8207), $0.50 a copy; *Report of the Sodium, Heavy-Water Reactor Task Force* (TID-8515), $0.50 a copy; and *Comparison Test of Reinforcing Steel* (WT-1473), $2.25.

"POWER REACTOR TECHNOLOGY," quarterly technical progress review series published by the AEC, now has a complete subject index incorporated in the Vol. III, No. 4, cumulative for all previous issues, dating back to Dec. 1957. Such indexes are also planned for the Commissions Reviews "Reactor Fuel Processing" and "Reactor Core Materials," and "Nuclear Safety."

"MATERIALS IN NUCLEAR APPLICATIONS," 344 pages, the most extensive volume ever published by ASTM in the nuclear field, is now available for $8.25 a copy.

Split-second photography, with camera below water level in this observation tank, shoots plunging fuel element, tells GE engineers at Hanford much about fuel element behavior.

WASHINGTON OUTLOOK

Another Hells Canyon

Webster defines "prelude" as "Any introductory or opening performance. That which foreshadows a coming event."

Preliminary maneuverings in the case now before the Federal Power Commission involving applications to build the rival High Mountain Sheep and Nez Perce projects, couldn't be more prelusive. They foreshadow clearly another politically-charged, no-holds-barred fight of the Hells Canyon variety.

What is building up is an outright American enterprise versus collectivist power battle. Center-stage participants are Pacific Northwest Power Co., which seeks to build High Mountain Sheep; and Washington Public Power Supply System, a combine of 16 Washington State PUD's, which proposes to build Nez Perce. Early in 1958 FPC denied PNP a license to develop the Low Mountain Sheep-Pleasant Valley project, holding that it would not fully develop the water resources of the Middle Snake River. The company claims its present plan will develop considerably more storage and more power than the Nez Perce plan.

PNP's big problem in the current case is to get a prompt and clean-cut trial of the competing applications on their merits. Chief counsel for WPPSS is Mrs. Evelyn Cooper, who represented the National Hells Canyon Assn. as intervenor throughout protracted proceedings in both Idaho Power Co.'s Hells Canyon case and PNP's earlier case.

Apparently bent on obviating another drawn-out affair, FPC ruled last spring that all direct testimony in the current case must be submitted in prepared form several weeks in advance of the actual hearing, leaving only cross-examination and possible rebuttal evidence to be heard. Mrs. Cooper, however, was able to get a postponement of the hearing date from July 18 to November 4, on the ground WPPSS needed more time to prepare its direct case. When the hearing convened the latter date, she had already filed a motion for a further continuance to January 9, 1961, based on alleged need for more time to prepare for cross examination. But Presiding Examiner William Levy denied the motion, ruling that another postponement was not "justified or desirable" and "would conflict with the Commission's policy against unduly protracted or delayed hearings."

Another indication of the climate in which the case is developing was the filing made by Mrs. Cooper two weeks before the hearing got underway. It charged that the prepared testimony submitted earlier by four FPC staff engineers showed "clear bias" and "preconceived conclusions" in favor of the PNP project. It also asked that Francis Adams, chief of FPC Bureau of Power, and Lesher Wing, FPC regional engineer in San Francisco, be subpoenaed to answer questions as to whether instructions had been passed down "which had the purpose, or effect, of influencing the testimony of the Commission's staff witnesses in this proceeding."

FPC staff counsel Donald Sander's answer called the WPPSS charges "an unwarranted and malicious attack on public servants, wholly without justification or foundation." Examiner Levy also denied the subpoena request.

Opening statements at the hearing further emphasized the case's underlying bitterness. PNP attorney Hugh Smith pointed out that National Hells Canyon Assn., having failed to torpedo PNP's application, sought from Congress a "political decision" in the form of a 5-year moratorium on any action related to development of the Middle Snake. And having failed in that move, he said, NHCA finally prevailed on WPPSS to file the Nez Perce application.

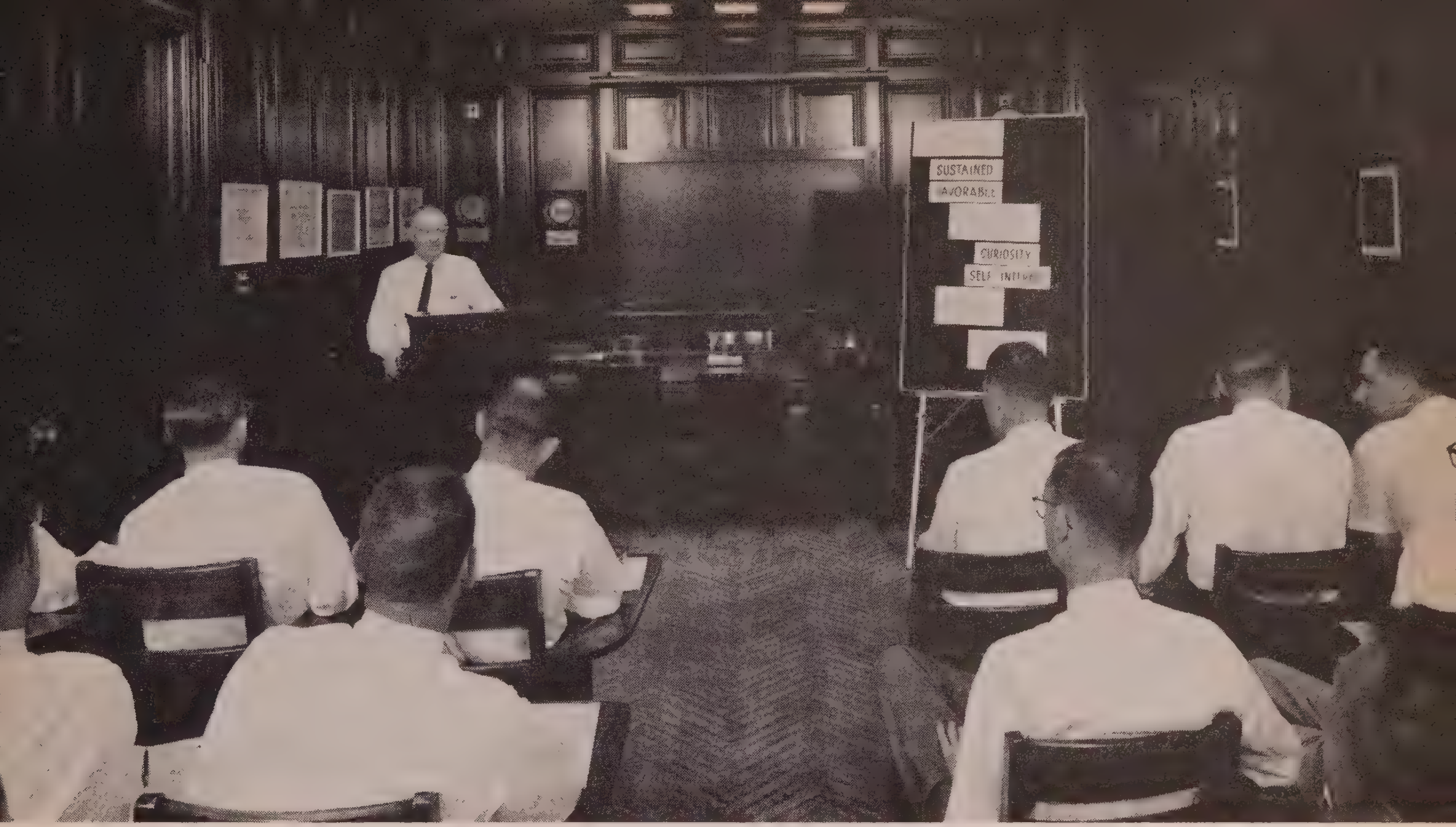
Smith charged that the public power group is before FPC for just one purpose, "and that is promoting and carrying on a political fight that was represented by the Hells Canyon case." In calling for a trial of the case on the merits, without delay, he said that "The actions of counsel for WPPSS . . . raise serious doubts as to whether that organization has any stomach for trying this case on its merits."

Mrs. Cooper contended that as a consequence of FPC's Hells Canyon decision, industrial development in the Northwest "has been at a standstill for the last seven or eight years" and can't be made to move again "without a new, large block of low-cost power." What PNP is proposing, she said, "is that the Northwest forego once again full development of the only great natural resource it has—the Columbia River and its tributaries."

The 5-year moratorium was sought to permit a "crash program" for solving the fish passage problem at Nez Perce, Mrs. Cooper maintained. (WPPSS now claims it has that problem licked.) But last February, she added, "pressures were being built up on the FPC" for an immediate hearing on PNP's proposal, and "it seemed inevitable" that the project would be licensed if a competitive application were not filed.

"Because the public power groups in the Northwest did not feel the region nor they could afford to see Nez Perce sacrificed to High Mountain Sheep," said Mrs. Cooper, "it was then that a Herculean effort was undertaken and the Nez Perce application was filed."

The case will drag well into next year, and will be the target for periodic political sharp-shooting.



The author covers major points in the Approach step of the selling process.

SALES TRAINING REFRESHER PAYS OFF AT NOPSI

Participation pays dividends in refresher training of New Orleans Public Service, Inc. commercial sales representatives. Sales results have increased and leads to dealers are at a record high.

By W. B. NOURSE, *Supervisor, Sales Planning and Training, New Orleans Public Service, Inc.*

DURING the first six months of 1960, 443 dealer leads for lighting and other commercial equipment were secured by commercial sales representatives of New Orleans Public Service, Inc., compared with 250 during the same period of 1959.

How much of this increase of 77.2% can be attributed to our Company's Commercial Sales Training Course cannot be determined, since many factors enter into increased results of any kind.

Challenging Problem

How do you approach the problem of retraining a group of 20 experienced utility sales representatives?

How do you teach fundamentals of salesmanship to these men who have been exposed to the fundamentals of salesmanship many times?

How do you resell the valid conclusion that fundamental principles do work?

The training of experienced utility sales representatives—and in this case, non-merchandising utility sales representatives—is a difficult and challenging problem. Without question it must be agreed that even the most experienced sales representative can benefit from refresher training in the fundamentals of salesmanship, but in deference to the knowledge and experience of our group, the course content and the course conduct demanded careful study.

Reselling Salesmanship

The training staff made one important decision at the outset. It was a decision based on this question: "In the face of a deluge of articles both local and national about the high cost of distributing goods, are our people still completely sold on the role of the salesman in the nation's economy?" This was not a direct question asked of the men; it was merely a point to consider, and, after serious consideration we discovered that the answer was neither "yes" nor "no." Since we did not have a definite "yes," it was decided that salesmanship itself needed to be resold before anything else was done.

Other questions needed answer-

NEW PRODUCTS SURVEY

PRODUCT	A	B	C
An auto map light that plugs into the dashboard cigarette lighter. A plastic shield keeps the light below the driver's line of vision and shields the user's eyes.			
A plug lock designed to keep plugs secure in wall outlets, thus preventing refrigerators, freezers and other electrical equipment from accidentally unplugging.			
To keep guns rustfree, a storage bag of transparent polyethylene and two rust-inhibitor discs to attach to the trigger guard and barrel of the gun. The discs release chemical vapors that prevent rusting.			
An auto play shelf for children can be folded flush with the back seat. Its four feet of colored pegboard, blackboard and coloring space keep the children amused during long trips. It also converts into a meal table.			
A nut remover kit that contains the proper equipment for splitting rusted or frozen nuts without damaging the bolt or its threads. It can be used 100 times without regrinding the cutting blade.			
A chemical concrete cleaner that penetrates into the concrete to float out grease and oil so that they can be wiped away with a cloth.			
A home plumbing kit that contains 100 parts and an illustrated instruction book to enable the homeowner to make minor plumbing repairs.			
An indoor gas incinerator with a ceramic-lined flue that eliminates all smoke and odors.			
An instant mower starter that eliminates the strain and dangers of pulling starter ropes. The unit can be installed on most mowers that have the conventional rope or rewind starters.			
Wire screens that attach with clamps to metal or wood gutters to shut out debris and prevent clogging of gutters, downspouts and dry wells.			

A. Yes, I've heard of it.
B. No, never heard of it.
C. Yes, would buy if price okay.

New Products Survey used in course to prove need for selling. After completing survey the men were told that all the products listed were available on the market today.

ing, too, before a completely adequate course could be designed.

How extensive should the retraining be, and what specific subjects should be included?

How should interest be acquired and sustained? Would a subjective approach be the best and if so, how should the classes be handled to secure this subjectivity?

Should attitude training be included and if so, what approach would be best?

Method of Presentation

From the beginning it appeared that the success of the course would depend as much on the method of presentation as it would on program content. Method of presentation in this sense was not limited to a choice between lecture and discussion, but rather embraced wholly the concepts of interest and communication. We also decided that interest could probably be better sustained and variety, a cousin of interest, secured through change of pace and change of face. Therefore, two members of the training staff rather than one, conducted the 90-minute classes.

Basically one instructor handled the presentation of sales theory, the other the application of theory to the specific sales job performed by the group. In this way the burden of preparation was less severe on each instructor, change of pace was almost certain at each session with each instructor handling a portion of the instruction, and the change at about midpoint in the class added a certain amount of necessary variety. This plan proved popular with instructors and class.

Further, the problem seemed to be centered around reselling the idea that fundamentals do work, that even though we have been trained in these fundamentals we unconsciously neglect them, and that, as in other fields, a periodic refresher in the basics of the profession is good business.

Student Participation

Having come to this conclusion, the training staff concentrated on building a series of classes founded on student participation. It was felt that participation—as opposed to static listening—would provide the spark to ignite and keep burning the fuel of interest.

With these decisions behind us, the first meeting was designed with two things in mind. First, interest through participation; second, an awakened realization of the importance of salesmanship, personal salesmanship, in our economy. Through a demonstration of new, but virtually unknown products, a demonstration during which the men themselves tried the new products, interest in the products was aroused and the point made that personal demonstration was necessary to secure customer action. Background information on the products and the manufacturers was furnished along with sales history information.

Since all products demonstrated were sold in a direct-selling operation only, the sales figures quoted proved what they were intended to prove: that salesmanship, personal salesmanship, was needed to do the job. At this point we were able to draw a parallel by asking this question: "If most of these products are unknown to you, and you have said that they are, and if you have been impressed by this demonstration, and by your actions you have, are you, in the selling you do, overlooking the importance of demonstration, and are you assuming incorrectly that the customer knows more about your product than he does?"

Our next step was to bring before

the group the very latest information in two important areas: Basic Motivation and The Skill of Listening. We felt that the men should be brought the latest information in the area of Motivation and the part this information could play in their approach to the customer. And since a skilled salesman should be a skilled listener, we felt that everyone would benefit if some steps were taken to make the men conscious of the fact that listening, better listening, could be learned and could be made to work for the salesman.

After our second meeting, we discovered that interest was at a high level. Unsolicited comments from the group, comments of group supervisors, and active and voluntary participation in all of the demonstrations and discussions proved our original participation premise to be correct.

From this point we jumped with both feet into the text-book fundamentals of salesmanship—preapproach, approach, presentation, demonstration, handling objections, close—but still with subjectivity in mind.

Approach

One of the main points covered in the class on the approach, for instance, had to do with answering the prospect's unexpressed question, "What will this do for me?" Any sales course will stress that a salesman should promise a benefit. Our course, on this point, was designed to secure from the group the multitude of ways in which they could promise our customers benefits. They were encouraged to think—to speak their ideas—to participate with questions and from this session alone we were able to compile a workable list that was distributed to the class at a later meeting.

Another recommendation of any sales course in covering the attention phase of the approach is to recommend that the salesman exhibit something. We secured group participation and stressed the value of exhibiting something by having one member of the group go through a demonstration that he had recently used before a customer; he then reported the customer's reaction to this demonstration. Using that as a base, the group then constructed a list of the many sales aids available to them in the Sales Department that could be used and should be used every day as exhibits when making customer contacts.

There were many other recommendations presented relative to the all-important attention step of the approach, such as, "Use a curiosity statement," "Be different," "Be original." But rather than present these merely as suggestions, the student-participation phase of the training demanded the group think through and recommend ways in which they could actually use these ideas when making field contacts.

Subjectivity Is Stressed

Throughout the course we developed and stressed subjectivity by building the theoretical aspects of fundamental salesmanship around the specific selling job required of these non-merchandising sales representatives. For instance, basic salesmanship emphasizes the value of having a ready supply of talking points. We forced group participation in this area by allowing class time for the preparation of a list of talking points on store lighting. Since we were teaching the value of the advantage-proof-action selling process, we used the list of talking points to demonstrate the fallacy of using unprovable talking points.

To illustrate, if in selling store lighting a man indicated that as a talking point he would use the statement, "Better store lighting tends to improve housekeeping," we asked that he then tell us what he would do or say next to prove this statement. If he could not follow up the statement with valid proof, it was then pointed out that this statement was not a good talking point. In this way we uncovered many seemingly good ideas the men were using but which, under close inspection, proved to be nothing but talk, rather than valid talking points. Using this method, we were able to stress the importance of being prepared to prove every statement made, and, by having the men prepare their own list of talking points, were able to keep the subjectivity we sought.

In another exercise designed to secure interest through participation we furnished each class member a form containing three questions with space for write-in answers. The form was designed so that the answer to the second question depended on the answer to the first question, and the answer to the third question depended on the answer to the second question. The men were instructed to answer only the first question and then to exchange papers. The first question read, "Why should I find time to listen to your story?" The men were asked to imagine that a customer had asked this question and were further instructed to answer the question in one attention-arresting sentence. When the papers were exchanged, the men then answered the second question based on the answer given by someone else to question number 1. The same procedure was followed for answering question number 3. In this way we were able to uncover before the group and with the help of the group, new and different ways to gain a prospect's attention. And, we were also able to illustrate the importance of conciseness in presenting and proving customer benefits.

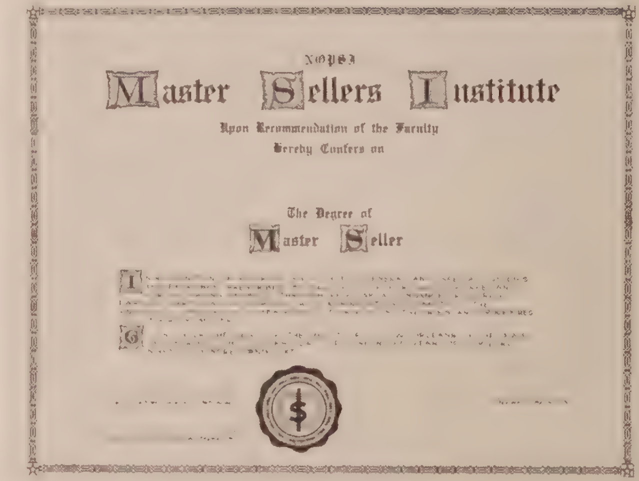
New Products Survey

Group participation was secured in other ways and at no time did we lose sight of the fact that group participation was not only good, but absolutely necessary. A "New Products Survey," was used to prove the need for selling. After completing the survey the men were told that all of the products were available on the market today. We were able to compile quite a list of ready customers, customers who would buy if approached, but would not make the effort to search out the supplier of these items. In another participation exercise, the men were asked to prepare four lists of personality traits as follows:

1. The Characteristics of the people you like
2. The Characteristics of the people who like you
3. The Characteristics of the people you dislike
4. The Characteristics of the people who dislike you

Once the lists had been compiled,

it was relatively simple to see the correlation between them, and then to stress the seemingly obvious fact that we can control the customer's reaction to us by searching for those traits that make him likeable and by exhibiting the most likeable side of our own personality.



NOPSI

Master Sellers Institute

Upon Recommendation of the Faculty

Hereby Confers on

The Degree of

Master Seller

Awarding the Master Seller Diplomas was highlight of the commencement exercises. General Sales Manager, C. J. Sinnott, has just presented "diploma" to Don Madden who is reading it to the group. "Diploma" that was awarded to sales representatives attending the refresher training series at the "graduation" dinner is shown below.

Auction Is Staged

To illustrate the difference between attention and meaningful attention, we staged an auction. We purchased a $2.50 necktie, wrapped it in an outsized box, and told the group that something of value was in the box. That's all we told them. Then we opened the bidding for the box with the tie going to the highest bidder. We succeeded in gaining the undivided attention of the group during this auction, and followed up by pointing out that though we got their attention, the time spent on the auction was just time wasted unless it could be tied directly to the points which followed.

At the class on Listening we staged distractions to prove the difficulty of listening under such circumstances. With this device we were able to dramatize our main point, "that sales representatives should carefully pick the time and location of interviews in order to lessen a prospect's outside distractions thereby insuring better listening."

The Close

During the class devoted to The Close, we handed out one 3 x 5-in. card to each of the class members. On each card was a question taken from the booklet, "46 Ways To Close More Sales," purchased from the Kirkley Press. Here are a few of the questions:

1. "Did I take the trouble before calling to learn something about the prospect's business, his requirements, his problems, his competition?"
2. "Did I get the customer's full attention?"
3. "Did I bring him something new on every call?"

The men were asked to read the cards to the group and then the instructor asked questions about the point covered. For instance, when the man read question number 3 above, he was then asked directly, "Have you ever tried to do this?" "What can you do?" "What can you use to do this?" "Do you feel that your customer will appreciate this?" Using this method, it was possible to secure undivided attention because the group by this time wanted to learn what the others were doing. The result was that we were able to get a number of excellent ideas about specific points.

Case Problems

We believe that knowledge and skill in selling can be acquired through classroom practice just as any other skill can be learned through practice. Following this reasoning, the classes on the Presentation and the Demonstration were built around case problems. At least two weeks prior to the training classes, a number of two-member teams were formed and handed a case problem, typical to our type of selling. They were asked to develop a solution to the problem and to be prepared to present the solution before the group. They were further instructed to utilize all of the theoretical points brought out in the class and to be prepared to discuss the value to them personally of preparing the solution to the problem. After each solution was presented before the class group, the class members were asked to evaluate the good and bad features of the solution. In this way we were able to demonstrate theory in action, were able to stress the importance of preparing for a call, and succeeded in securing the admission that planning and preparation were not only necessary but tremendously helpful to the individual.

Graduation Dinner

To climax the successful completion of this refresher training, Management sponsored a special "graduation" dinner for the group. This dinner provided an ideal opportunity for improving management-employee relations, so plans were made to present a slightly humorous program and to award mock diplomas to those who attended the series. The Sales Promotion Division also produced special invitations to the dinner and organized a

(Continued on page 77)

Project EHV Gets Three More Installations

Reports of three installations on Project EHV—two structures, and capacitors come from General Electric Co.

The capacitors—highest voltage gas-filled units ever built for outdoor use—are in. The three units, weighing 4.5 tons each, and which are 19-ft high, were designed and manufactured by Canadian General Electric's Davenport Instrument Transformer Works, Toronto, Canada. According to Dr. P. A. Abetti, manager of Project EHV, the units have been designed for operating voltages as high as 750 kv, and will withstand lightning surges up to 2,050 kv.

The sulfur-hexafluoride filled capacitors, rated 650 kv, will permit precise measurement of line voltages from 380 to 750 kv. They have negligible phase angle and loss errors.

The Project's only wooden tower—a glued laminated-wood structure, 123-ft high—has been erected. This tower, number 14, was the second to be erected. It was built by RILCO Laminated Wood Products Div. of Weyerhaeuser Co.

Built from West Coast Douglas Fir, the wood alone weighs more than 19 tons, with special steel catwalks and other hardware adding on seven tons. It's crossarms are 94-ft long. The two legs holding the crossarm measure 98-ft each. Legs and crossarms are laminated from 1⅝-in. by 7⅛-in. structural wood plies bonded with special weather-proof adhesive. The tower is set in packed gravel foundations 15-ft deep.

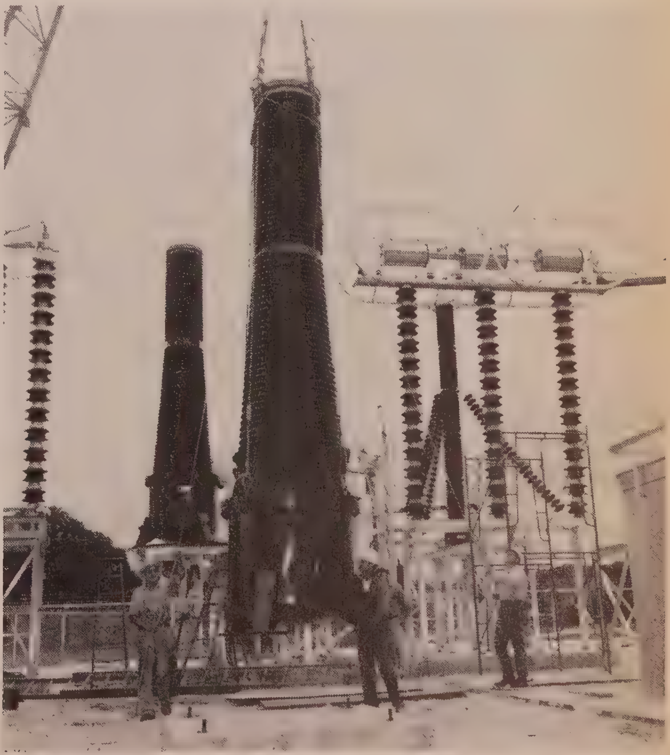
A 74-ton prestressed concrete tower is also in. It was supplied by the Prestressed Concrete Institute, which represents the prestressing industry. It was designed by Schupack and Zollman of Stamford, Connecticut and manufactured at New Haven by C. W. Blakeslee and Sons.

The 99-ft high tower is unique for several reasons in addition to size. The legs and the 93-ft crossarm are hollow to reduce over-all weight. The legs are set 4½ ft into reinforced concrete sockets in the two tower bases. Each of the two bases rests on four piles driven 80 ft into the ground.

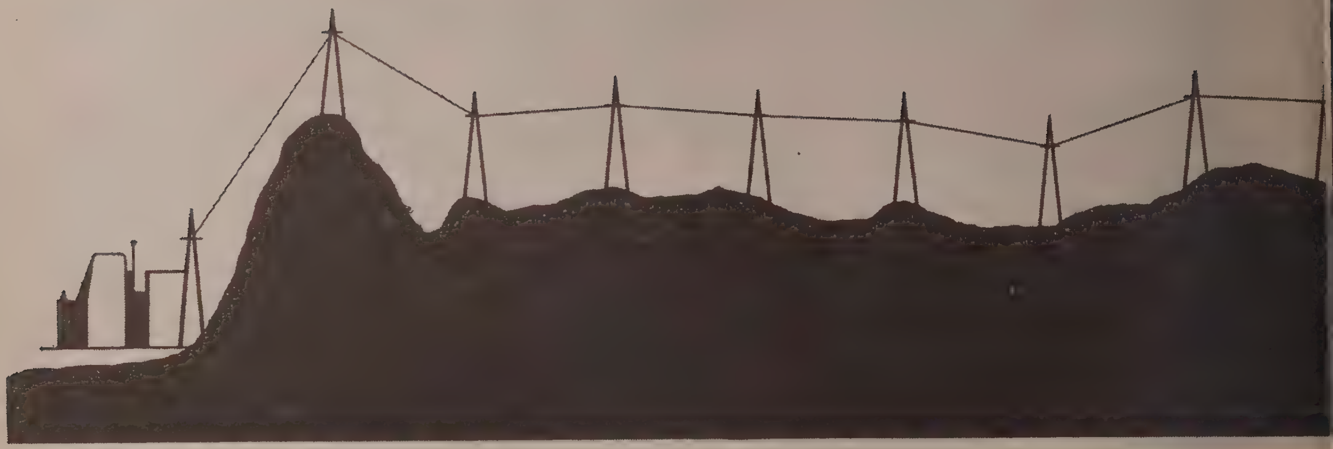
Pretensioned steel strands are used in the members to keep the concrete under compression. This has bowed the crossarm slightly upward as erected. The arm will straighten when the conductors are hung.

Fourth in the series of 18, this tower is labelled number 12, and is located in the Project's long section which will be energized next year.

Legs and crossarm of this prestressed concrete tower are hollow to reduce weight.



SF_6-filled 650-kv capacitor is eased in. Note twin unit installed on pedestal (rear).



Profile of 460-kv line showing approximate terrain over which line was constructed—two mountain ranges and a valley.

AMERICA'S FIRST KILOWATT TURNPIKE OPERATING AT 460-KV

PENELEC has rung up a "first" for the U.S.A.—a 460-kv line now operating as a major link in the GPU integrated transmission system.

AN HISTORIC event took place when a switch was thrown September 30, 1960, to energize the newly constructed 460-kv line between Claysburg and Saxton, Pennsylvania.

On that date, the first three-phase, operational 460-kv line in the United States was placed in service by the Pennsylvania Electric Company in cooperation with 12 major manufacturing companies and two construction companies.

This line was not built merely to study the phenomenon of a transmission line being energized at 460-kv but to study the performance characteristics of the EHV line under actual three-phase operating conditions.

Rugged Site Chosen

The site chosen for this experimental line was in the rugged Allegheny Mountains of Central Pennsylvania. The EHV line parallels an existing double-circuit 115-kv line and with the installation of two 115/460-kv substations flexibility was provided for taking the 460-kv line in and out of service during tests without interrupting system operation.

The specific location for this line was chosen for the following reasons: suitable existing terminating substations, a reasonable line length, higher than normal lightning frequency, rugged winter conditions of wind and icing, close proximity to the engineering staff headquarters and the ability to be easily integrated into the existing transmission system. In addition and highly important, if this line "passes the test," it can become a section of a proposed West to East 460-kv transmission line for the General Public Utilities system which now has both 115-kv and 230-kv lines extending across its subsidiaries' service areas. This interconnection is designed not only to permit more economical loading of generating stations and to provide substantial back up but also to transmit large blocks of power eastward from the low-cost generating units in the Pennsylvania coal fields.

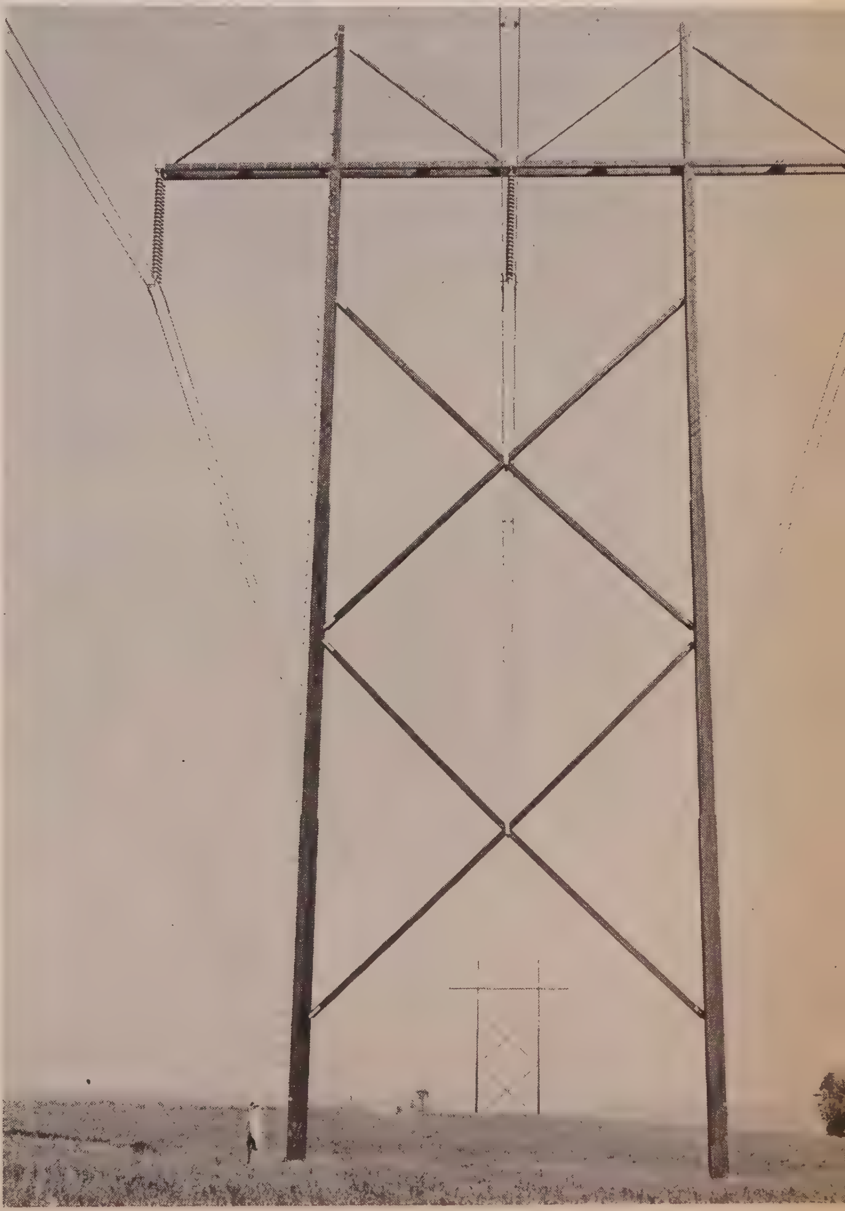
The right-of-way for this line is

210 feet wide with 190 feet cleared. With a maximum of 86-ft 7 in. crossarms on steel towers to a minimum of 79-ft crossarms on wood structures the right-of-way is more than adequate. Minimum ground clearance was held to 40-ft and minimum clearance over other circuits was set at 28-ft.

The line was designed to meet NESC heavy loading specifications of ½-in. radial ice and 40-mph winds and, in addition, to stand 100-mph wind with no ice or a vertical load of 1.5-in. radial ice with no wind.

Footing Resistance

Using the direct lightning stroke theory, a desired performance level of one outage per hundred miles of line per year and an anticipated maximum stroke current of 100 kiloamperes, a maximum tower resistance of 50 ohms was selected. Tower-footing resistance readings were taken at all structures on the line. Resistance readings ranged from 1 to 250 ohms and averaged 22.8 ohms. A radial-type counterpoise was installed at the footings that had greater than 50 ohms resistance.



Right, laminated-wood H-frame structure with double suspension-string insulators on nearest structure, second structure is also laminated-wood with center phase using V-string insulators. Twin-bundled conductor has flexible-loop type stainless steel spacers with clamps on center and right phases and Preformed aluminum spacers on left phase.

Special and Unique Construction

Four materials were used for the 14 different type structures installed on this line in order to test the practicality of each. They are: conventional wood-poles, laminated wood-poles, tubular steel-towers and conventional steel-towers. Experimenting is also being done on four different sized ACSR conductors. Twin-bundled 1.75-in. diameter expanded ACSR was installed on 4.14 miles of the line, twin-bundled 1.6-in. diameter expanded ACSR on

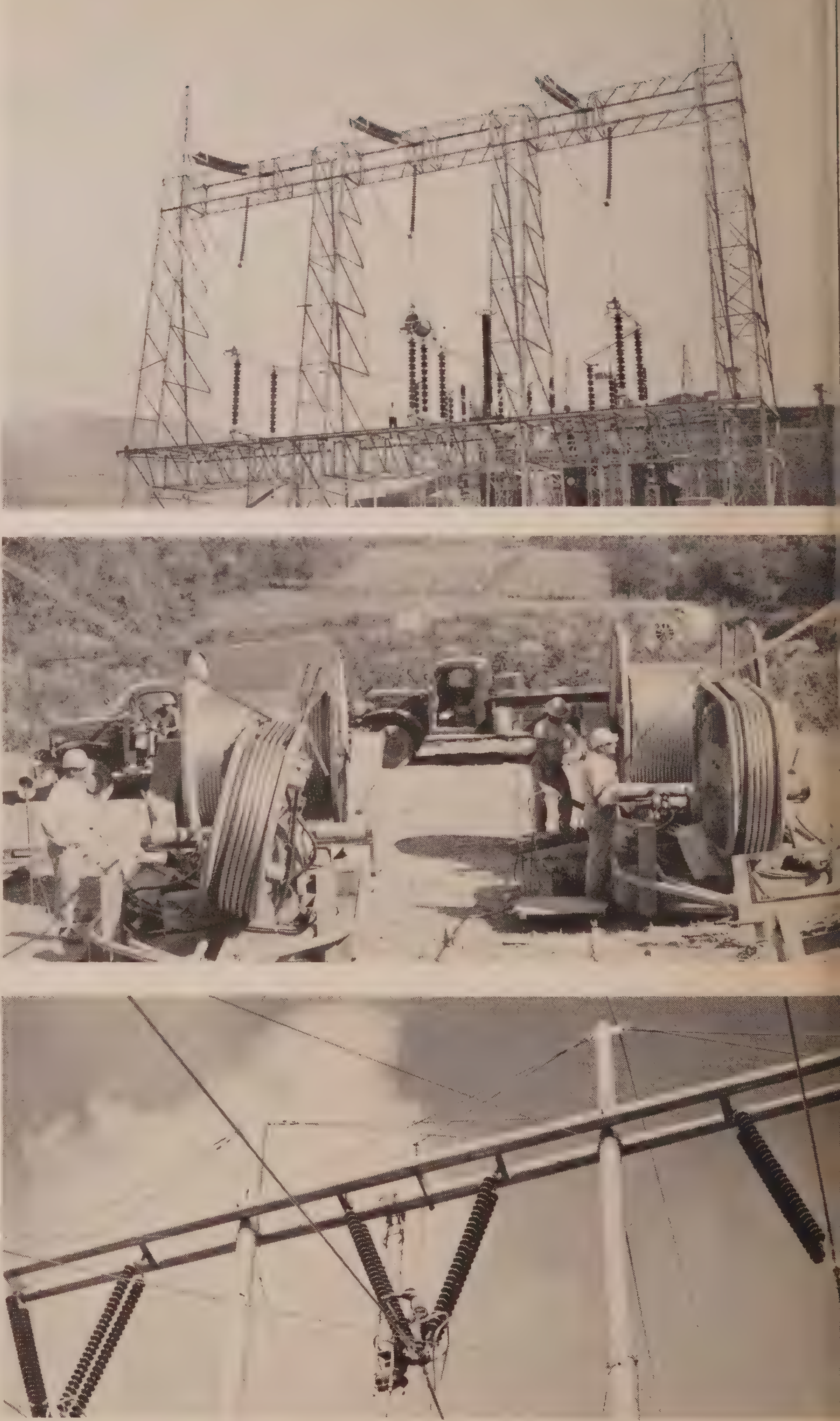
3.17 miles, 1.4-in. diameter expanded ACSR on 3.78 miles and a special-designed 2.32-in. expanded ACSR on the remainder of the line. All of the twin-bundled conductors were installed with 16-in. spacing. Half of the overhead ground wire is 0.5-in. EHS steel strand and the other half is 7-#6 "alumoweld."

The insulators used on this line are of the normal size of 5.75-in. x 10-in., ball-and-socket type, with 25,000 lb rating (About twice normal rating). Most tangent structures have the insulator strings mounted in a "V" configuration having two strings attached to each phase to prevent side-swinging of the conductor. This permitted closer phase spacing than would have been necessary with free-swinging suspension. The number of insulators per string varies from 26 to 30 depending on the type and kind of structure.

Much of the equipment such as transformers, circuit-breakers, blade switches, corona rings, spacers for bundled conductors, etc. were specially designed and custom-built for the line. Also, many new construction methods had to be developed during the 260-day construction period. All of the conductor was strung under tension to prevent damage and to keep it clean so that corona would be kept to a minimum.

Cooperating Companies

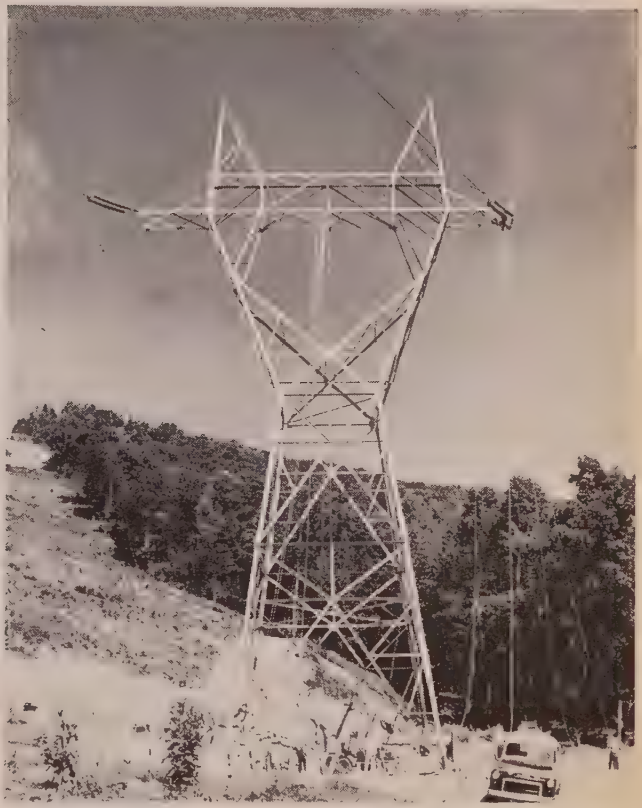
Cooperating with Penelec on this EHV Line were the following manufacturers: Aluminum Company of America, Bethlehem Steel Company, Copperweld Steel Company, General Electric Company (Brewer-Titchener Corp., Liskey Aluminum, Inc. and National Electrical Manufacturing Co. participated with the G. E. Insulator department on the developmental project), Hughes Brothers, Inc., I-T-E Circuit Breaker Company, Kaiser Aluminum & Chemical Corporation, Ohio Brass Company, Pennsylvania Transformer Division of McGraw-Edison Company, Preformed Line Products Company, Rilco Laminated Products and Union Metal Manufacturing Company. Construction was shared by Day & Zimmerman, Inc. and Sordoni Construction Company. These

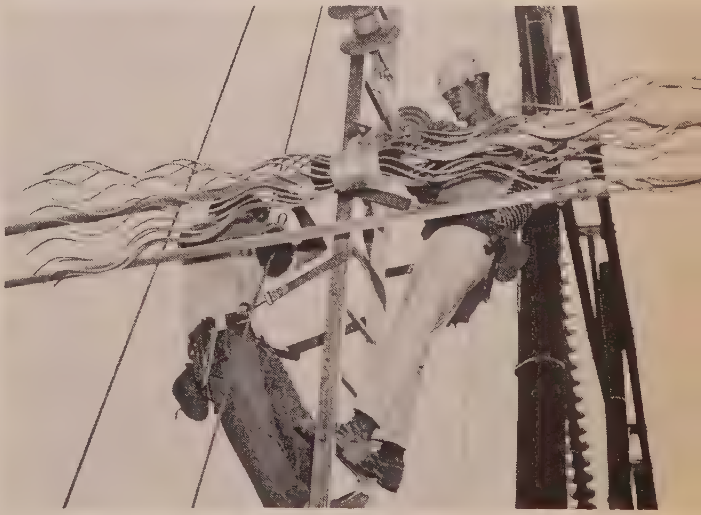


TOP, Saxton Substation—eastern terminus of Penelec's 460-kv line. Wave trap is installed on center phase. Also, a trolley-mounted, 16-ft high coupling capacitor can be seen slightly to the right of the center phase; this capacitor can be moved on a track by means of a cable windlass and crank mechanism to any of the three phases for testing purposes. CENTER, stringing ACSR conductor under tension with specially designed equipment capable of 30,000 lb pull, plus tensioning machines capable of applying variable tensions up to 12,000 lbs apiece. BOTTOM, guyed tubular steel tower, double V-strings of insulators supporting 2.32-in. diameter expanded ACSR conductor on large vertical angle. Linemen are installing the corona rings.

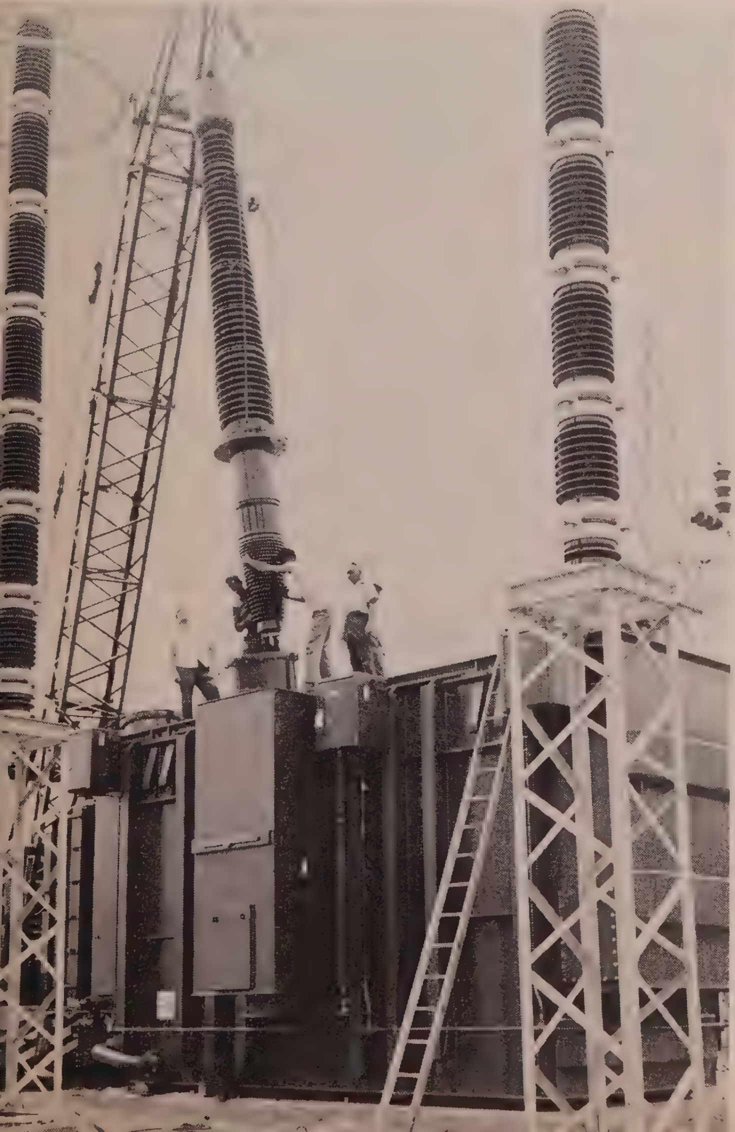
Left, linemen are installing tapered armor rod on twin-bundled conductors with V-type suspension.

Below, conventional-type, single-circuit galvanized steel dead-end tower specially designed for the 460-kv line.





Above, linemen installing Preformed armor rod on twin-bundled conductors with V-type suspension.

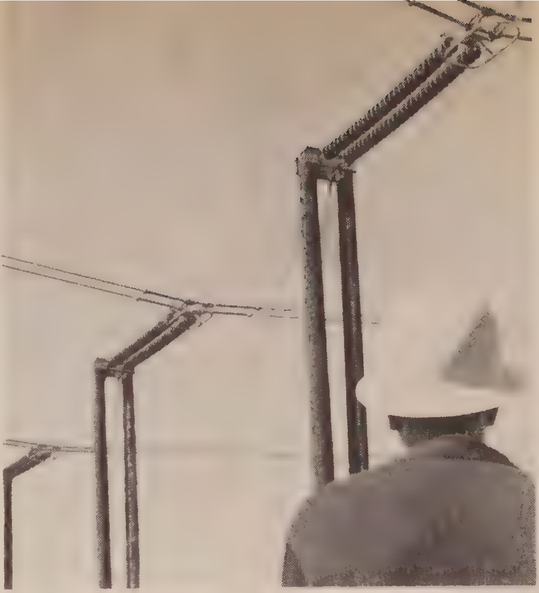


Left, installing one of the high-voltage bushings in the three-phase 60 MVA autotransformer in the Claysburg substation at the western terminus of the 460-kv line. The high-voltage bushings are 23-ft long and rise 16-ft above the transformer cover. The Magnevalve station-class lightning arresters are the world's highest rated lightning arresters.

concerns not only assisted with preconstruction research and testing, but several will cooperate in the two-year testing program Penelec plans to conduct.

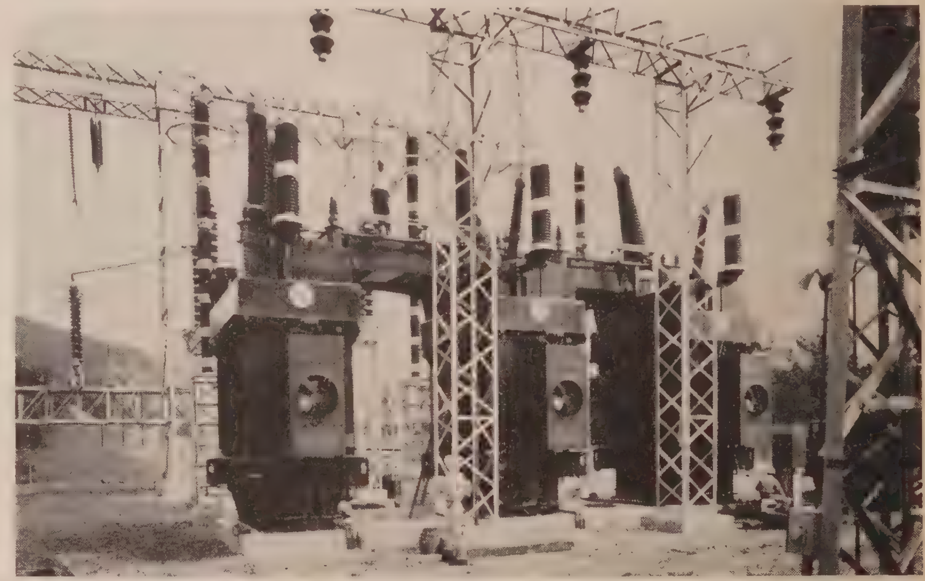
Two mobile laboratories will be utilized to test operating characteristics and evaluate the relative advantages of the four different sizes of conductor and the 14 different types of structures used in the construction of this EHV line. Confirmation of insulation design, study of unusual 60-cycle power behavior, review of safety and psychological aspects, study and measurement of radio influence voltages, analysis in inductive and other coupling effects, lightning study, measurement of losses, determination of the feasibility of carrier applications, study of effects of ambient and concurrent weather conditions and reaction of line conductors and structures to conditions of aeolian vibrations are the primary considerations that will occupy the time of several full-time engineers during the two-year test period for this line.

The line was designed by Penelec engineers, assisted by engineers from the supplying companies and from West Penn Power and Metropolitan Edison.

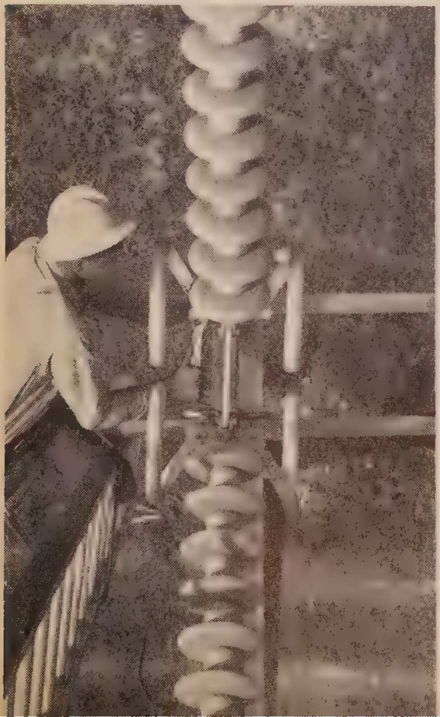


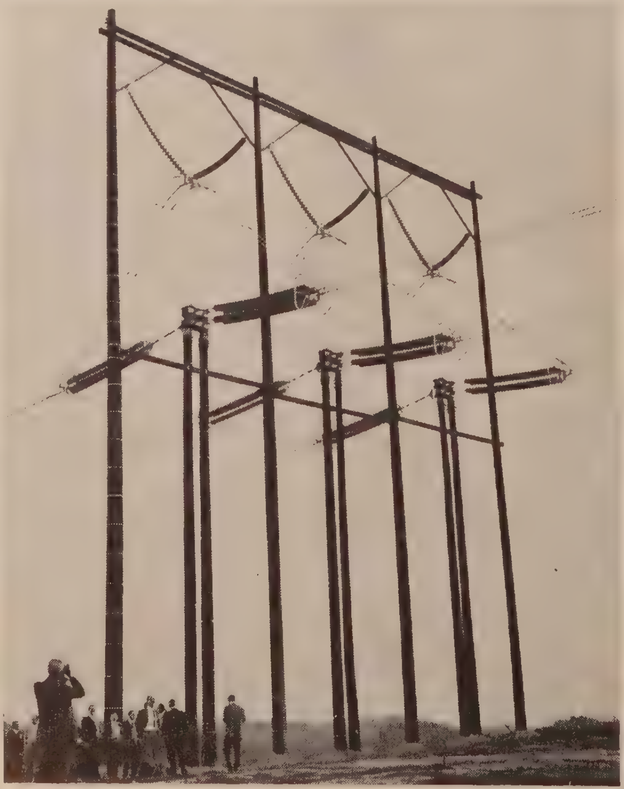
Left, this wood-pole running angle is unique in that it has two poles and two insulator strings per phase and two suspension clamps per conductor.

Below, three single-phase 20-MVA autotransformers were installed in Saxton substation as highway bridge weight limitations precluded installing one three-phase transformer. To utilize the clearance space necessitated by the extra high voltage, the oil-expansion tanks are mounted between the transformers.



Below, view looking downward from tower crossarm into apex of a V-string suspension insulator assembly. Tapered armor rod is used to protect the 1.75-in. twin-bundled expanded ACSR conductor here. Lineman is installing the corona rings.





Left, wood-pole dead-end structure with twin-bundled conductors and Preformed aluminum spacers on one side of structure, flexible stainless steel spacers with bolted clamps on overhead twin-bundled jumpers and specially - designed 2.32-in. diameter single conductors on other side of the structure. Quadruple-string insulator dead-end assemblies are on twin-bundled conductors; triple-string on single conductor dead-ends.

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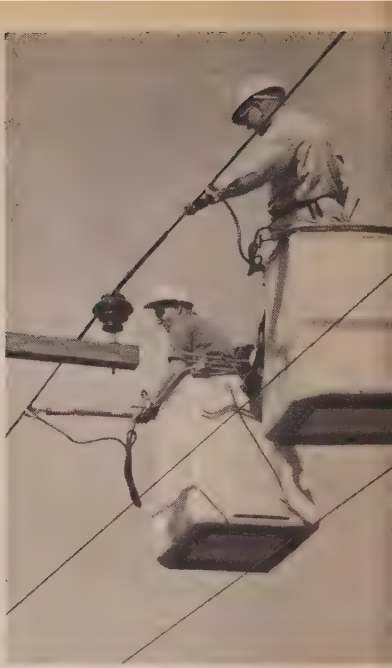
LIVE LINE MAINTENANCE WITH BARE HANDS CUTS MAN-HOURS AND HAZARD


Contact — but workmen don't feel even a tickle as they connect themselves directly to energized 34-kv power line. Metal screen lining inside of bucket and conductive-soled shoes keep them protected.

Operating experience with a revolutionary new technique proves that it saves many man-hours in repair time and actually reduces hazard. Many operations can be performed with lines energized that formerly required removal of equipment from service.

By HAROLD L. RORDEN, High Voltage Practices Engineer, American Electric Power Service Corporation

MOST live-line maintenance can now be performed safely by having workmen insulated from ground and working at the same potential as the energized conductor. They can then work with bare hands or with ordinary work gloves. In addition to greater flexibility over conventional methods, savings in man-hours are appreciable.

At first thought, taking hold of an energized high voltage conductor with bare hands seems a reckless folly. But when we weigh all the circumstances, it becomes apparent that if one is adequately insulated from all other conductors, including earth, holding on to an energized conductor is not essentially different from being at ground potential and insulated from all other energized conductors. Earth is also an energized conductor—it is all a matter of what we choose to use as a basic reference. One important difference is that ground, or earth, is such a large conductor that the electrostatic field near its surface is less intense than it is near an energized high voltage conductor.

The possibility of using this principle for live-line maintenance with aerial lifts at the ends of insulated booms arose during discussions of safety practices and associated problems with Merle Fisher of the Ohio Power Co. We then worked together in conducting tests to demonstrate the feasibility of the method, first in a high voltage laboratory and later by demonstration on energized lines of Ohio Power. The Holan Division of the Ohio Brass Co. supplied the equipment and cooperated in conducting the tests and demonstration.

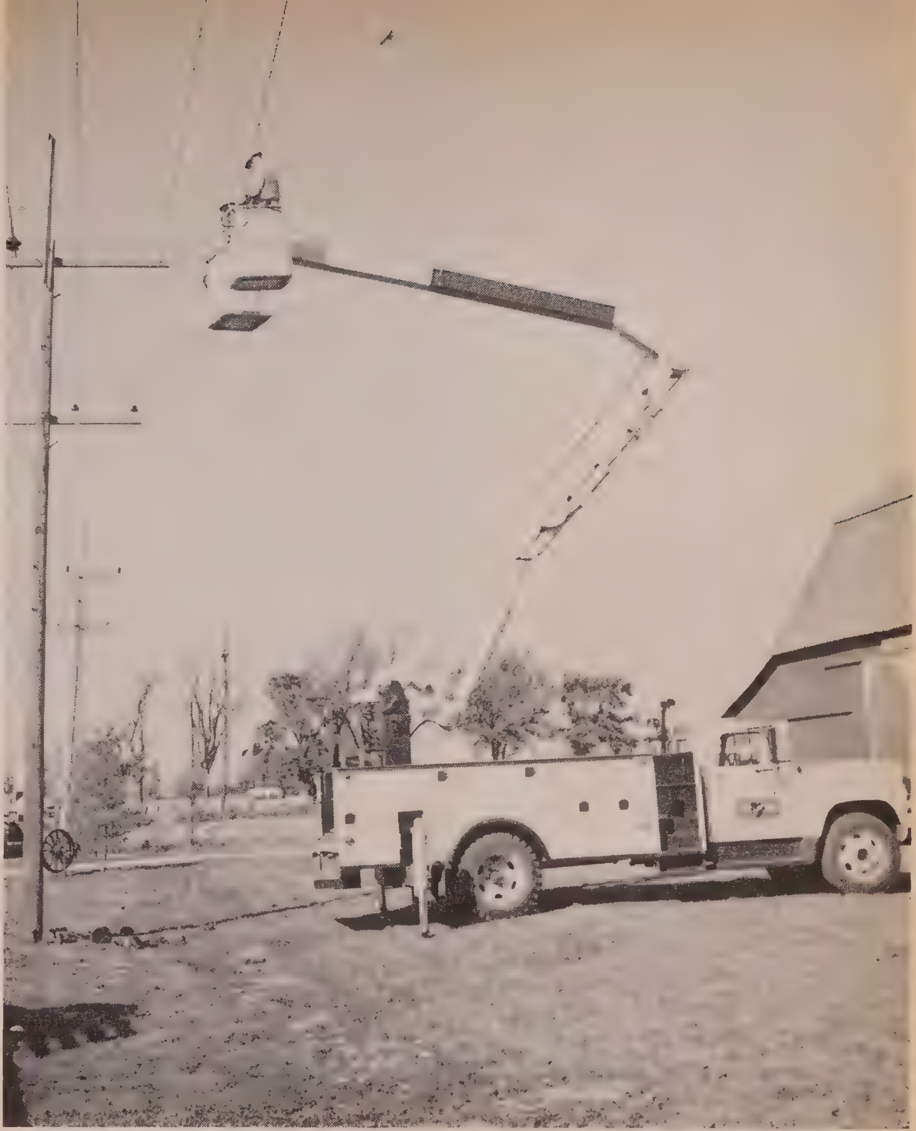
Laboratory Tests

In the laboratory tests, an aerial lift bucket, lined with metal fly screening, was placed on a platform insulated from ground. A flexible copper braid was then securely attached to the screen and equipped with a hook for attaching to the conductor. A conductor that could be energized from a controllable-voltage source was suspended at waist height near the bucket.

With this arrangement, tests were conducted at line-to-ground voltages up to the equivalent of a 380-kv system. The tests showed that there is no more danger at the higher voltages than at lower voltages, as long as insulation is adequate and some shielding is provided at the higher voltages. This shielding (for 345 kv) consisted of a metal cage open on one side to provide working space. Thus, at extremely high voltages the principle involves a partial adaptation of what is known as a Faraday cage. In 1837 Faraday demonstrated that one could be inside a completely enclosed metal container, insulated from ground and energized at high voltage, without receiving an electric shock.

34-kv Demonstration

The feasibility of this practice was demonstrated by performing scheduled maintenance work on lines of the Ohio Power Company. First an insulator and armor rod on the energized 34-kv North Baltimore-Portage line were replaced. Then a temporary jumper on the same line was replaced by a perma-



Safely insulated from ground by fiberglass boom of aerial lift, men replace insulator with bare hands while backed away from pole and other conductors. All movement of lift is controlled from above.

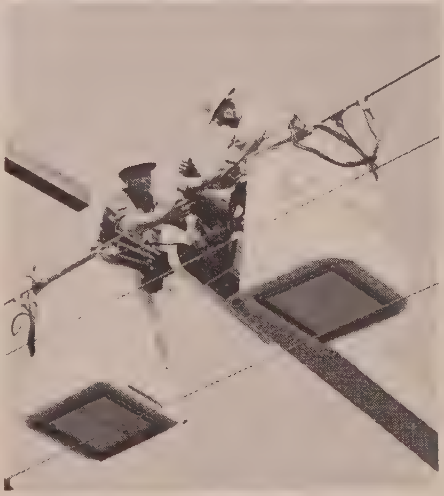
Replacing preformed armor rod around 34-kv conductor workmen enjoy freedom of movement.

nent splice. Both of these tasks were performed by two men working with bare hands on the energized conductors.

Insulator Replacement

The insulator was first removed from the arm; then with conductor and insulator, the workmen backed the bucket away from the pole. The major part of the work was performed beyond reach of the pole or other energized conductors. This phase of the work is shown in the accompanying series of photographs. The insulator replacement was greatly simplified compared with conventional practice. Noteworthy were the ease of replacing the armor rod, and the use of conventional hand tools, as well as elimination of the need for barriers.

Some tasks, such as replacing the middle insulator, will require development of special techniques, and barriers may be required. Undoubtedly, there are many cases that are better worked in the conventional manner, or by a combination of both methods, but the major



New insulator is attached to conductor using ordinary hand tools. Note clamps and cables for bonding conductors to metal screens lining inside of buckets. The three levers under workmen's elbow control all movement of the aerial lift.

Job is well done in a fraction of the time formerly required. Men stay clear of crossarm as they guide insulator into place. The nut is put in the insulator stud after buckets are disconnected from the conductor and lowered to convenient position.

Workmen at 138-kv prepare to repair damaged ACSR conductor discovered on Fostoria-East Lime transmission line. This aerial lift supports two linemen in one bucket, working to a maximum height of 65 ft.

Preparing conductor for installation of repair sleeve. Workmen are cleaning surfaces of strands using wire brush held by bare hands. Second bonding cable and overhead cage are extra safety measures.

limitation is accessibility rather than voltage. The ease of maneuvering the equipment makes it desirable to use the new method wherever it can be worked safely.

Permanent Splice

The splice was made in the top one of three conductors in vertical configuration at a pole where the line makes a right angle. This pole also supports a three-phase 12-kv distribution circuit below the 34-kv. The splicing was done with more ease than if the 34-kv line were de-energized and worked from such a congested pole. The men worked from a more favorable position and with more freedom of movement than would otherwise have been possible.

138-kv Demonstration

Repair sleeves were installed on two energized conductors of the 138-kv Fostoria-East Lima line at a mid-point in the span where several strands had been damaged by rifle fire. A 65-ft aerial lift was used for this work, and a screen liner for the bucket was designed and installed by Merle Fisher.

To illustrate this procedure for working at towers where conductors are within reach from the aerial lift, an armor rod was installed on a lower conductor of this energized 138-kv line. For this initial trial the insulator string was disconnected and the conductor supported by live line tools in the conventional manner. The preformed armor rod was then installed from the aerial lift. In previous practice an outage was required to perform this work.

During the course of this 138-kv demonstration, another possible application for the equipment was discovered. If desirable, inspections for hidden damage can now be made with the line in service where formerly this could not be done practically without de-energizing the line. Here, for example, two broken strands in the aluminum conductor were revealed when the insulator clamp was removed.

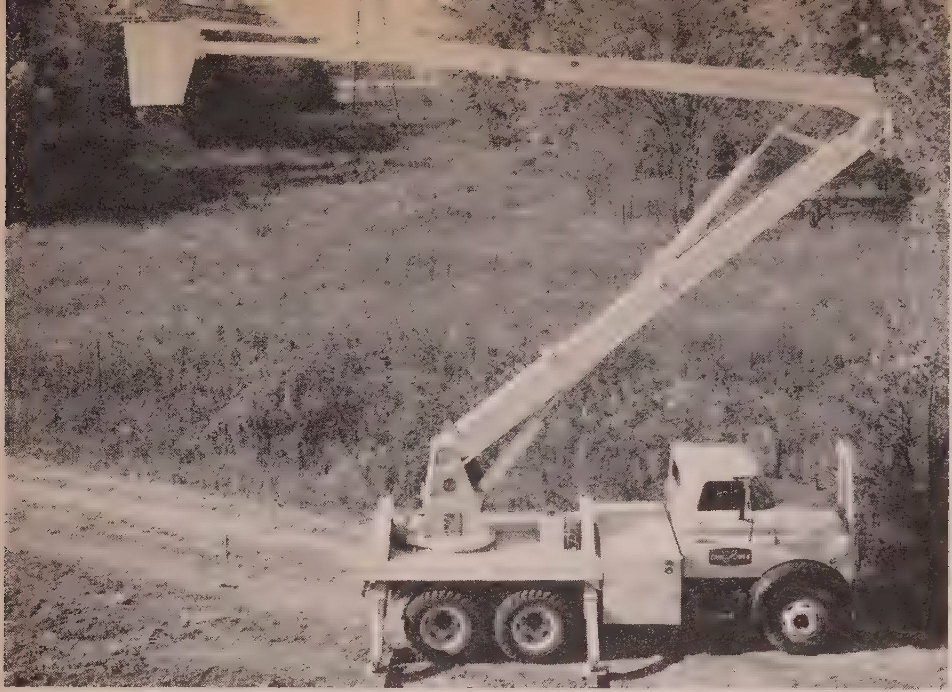
The repair sleeve and armor rod installation on 138-kv energized conductors is shown in the photos. These demonstrations indicate that repair time can be reduced substantially. With more experience, methods will likely be developed for simplifying some of these practices so that repair time can be further reduced. Also, many operations can be performed with lines energized, where they formerly required removal of equipment from service.

The accompanying table com-

COMPARISON OF TIME REQUIRED BY OLD and NEW METHODS

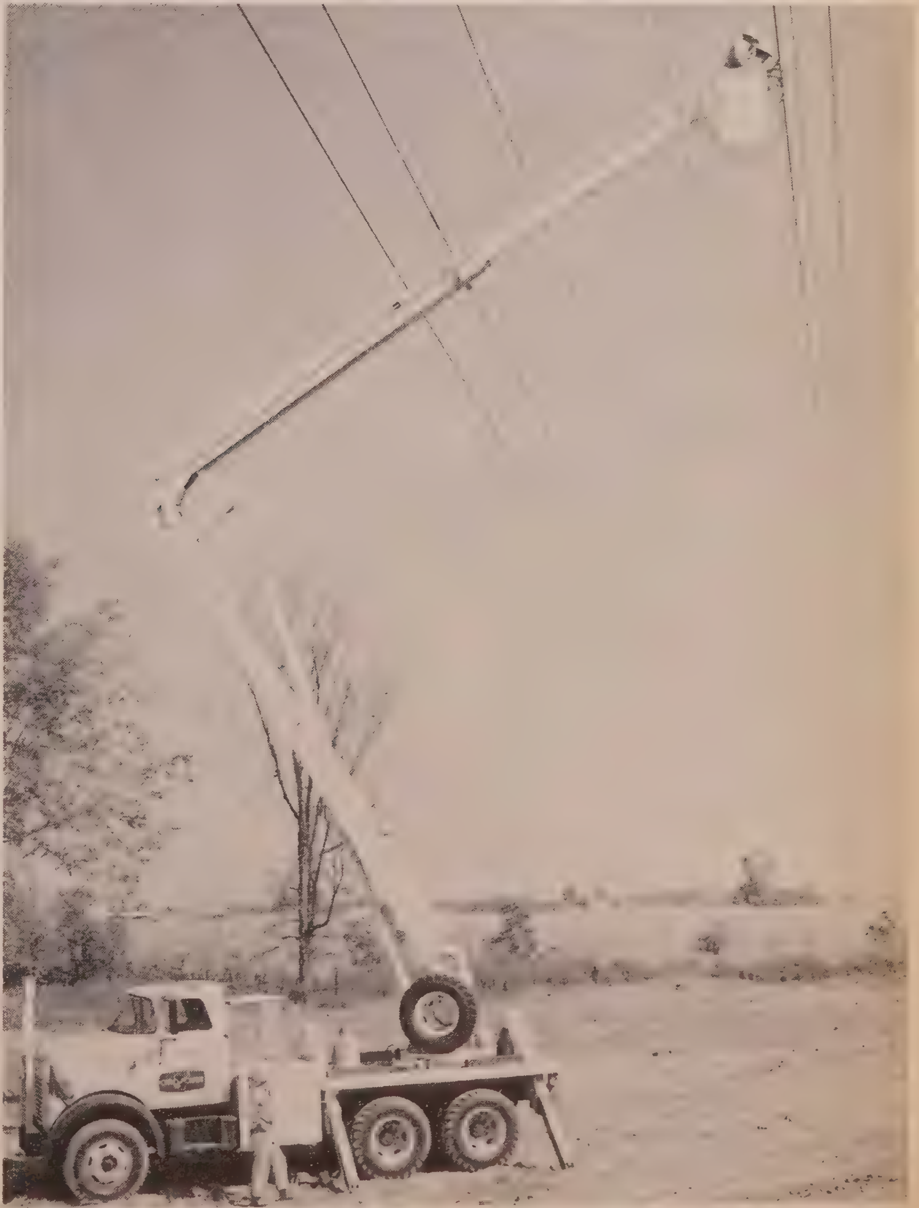
	Estimated Average Man-Hours	
Nature of Work	Conventional Methods	New Method
Change 34-kv insulator	5	0.5
Change 34-kv insulator and armor rod	10	1
Apply permanent splice at 90° junction on 34 kv*	2	0.5
Apply repair sleeve on 138-kv conductor*	30	1

* Last two types of work could not be done previously with line energized.



Compression sleeve being installed. Tool is placed over sleeve on conductor and a series of compressions made to insure gripping along entire length. Pressure is applied through hand pump inside cage.

Upper cage removed to provide greater accessibility for working, since it was found to be unnecessary for this operation at 138 kv. Man near truck is actually several feet away; safety rules prohibit anyone from being on or touching the truck.



pares the aerial lift method with the conventional methods, for the repair work only, performed during these demonstrations. The figures for the conventional method are based on average estimates obtained from representatives of several AEP companies who were present at these demonstrations.

Emphasis on Safety

Essentially, there is less hazard in the new method than in conventional methods. For example, any leakage current that may result from moisture conditions would terminate on the screen and therefore would be shunted around anyone in the bucket. Experimental tests are being conducted to determine the limitations for using this equipment. A thorough understanding of any hazards, as well as knowing how to safely apply this method under various circumstances will obviously be necessary. Information will be provided as equipment is tested and the details for performing various jobs are worked out.

PUERTO RICAN PLANT TRIES ADP

Having gained satisfactory experience and confidence from monitoring of start-up and shut-down operations in its Palo Seco Steam Plant, the Puerto Rico Water Resources Authority expects to use this phase as a transition step toward full automation.

By R. R. RAMIREZ, and
Assistant Executive Director
for Power Operations

M. IRIARTE, JR., and
Electrical Planning Engineer
Both of Puerto Rico Water
Resources Authority

R. R. TRESSLER,
Principal Engineer,
Control and Instrumentation Section
Jackson & Moreland, Inc., Engineers

FUTURE acceptance of automatic data processing systems in the field of automation may be largely determined by the degree of success experienced with early installations. Limited applications capable of being expanded in scope as feasibility is demonstrated by actual performance, appear to be a logical first step for industry's use of these systems. Recognizing the potential of automatic data processing, PRWRA has purchased a digital-computer-type data-processing system for the new Palo Seco Steam Plant at San Juan, Puerto Rico.

This station consists of two identical units with ultimate capacity for a minimum of six units. Turbines are of the condensing reheat design, each with a nameplate rating of 82,500 kw. Turbine steam conditions are 1450 psig and 1000F main steam, 1000F reheat steam and 2.5 inches of mercury exhaust pressure. Boilers are fired with No. 6 fuel oil, each rated at 650,000 pounds per hour of main steam and 554,000 pounds per hour of reheat steam. Each unit uses six extraction heaters for regenerative heating in its feedwater cycle.

The Palo Seco automatic data processing (ADP) system was purchased on the basis of an experimental technology which is expected to have a highly promising future. Its initial use should simplify appreciably the task of determining with dependability and accuracy the cause of disturbances and malfunctions. The ability to pinpoint specific plant component malfunction will permit preventive measures to be taken on a sound and reasonable basis as soon as performance starts to deviate from normal values. It is anticipated that the monitoring function, together with a more systematic and dependable method of logging plant data, should result in increased plant availability.

Other important considerations favoring the installation of an ADP system include improvement in operating efficiency, monitoring of start-up and shut-down operations, better quality of records and more effective use of personnel.

No conventional instrumentation has been eliminated as a result of installing an ADP system at Palo Seco. Operating experience gained from the first installation will largely determine the changes to be incorporated in subsequent station design. Since the station design was well advanced before a decision was made to purchase an ADP system, the use of automatic control outputs from ADP is not included in the initial installation but will be tried in selected control systems at a later date.

Initial use will be made of ADP for the major function listed below, each of which is discussed in detail in subsequent sections. A simplified diagram of process measurements is shown in Fig. 1.

1. Monitoring of important plant variables and bearing temperatures for major auxiliaries to determine abnormal operating conditions.
2. Hourly and on-demand printout of station heat rate, turbine-generator heat rate and boiler efficiency.
3. Preparation of the station's hourly log.

Paramount Considerations

Two technical considerations were paramount in the selection of an APD system for Palo Seco Steam Plant—flexibility and reliability. These considerations resulted in the purchase of a digital-computer system using solid-state components to the maximum practicable extent.

Some of the system data of general interest are in table on opposite page.

Equipment Functions

Monitoring—Each time a monitored variable is scanned, its value is compared against high and/or low limits stored in the computer. If a limit is exceeded, the time, point identification and value of the variable are recorded once by the alarm typewriter. When the variable has returned to normal value, a second record for the point is in-

SYSTEM

itiated by the alarm typewriter. Occurrence of an off-normal for selected points initiates a recording of certain related points to establish a set of background information.

Logging — Approximately one-half of the scanned points are logged hourly on a preprinted log sheet. This function completely eliminates the requirement for manual logging. Most of the quantities logged are averaged over the preceding hour.

On-Demand — Various on-demand features available to the operator are listed below. Except where noted otherwise, print-out is on the off-normal log sheet.

Single Point Once—single print-out of selected point.

Single Point Continuous—print-out of selected point with one-minute repetition, subject to program priorities, with automatic five-minute limit.

Performance Calculations — single print-out of all performance calculations for selected unit. Calculations are based on four-minute averages for variables concerned.

Visual Display — four-digit display of numerical value of selected point. Display up-dated every 15 seconds, subject to program priorities, with automatic five-minute limit.

Single Limit Values — print-out of values of stored limits for selected point.

All Limit Values — print-out of stored limits for all points.

Equipment Monitoring

The need for special monitoring systems during abnormal operating conditions has long been recognized by PRWRA engineers. The time scale with standard recording equipment is considerably compressed. As a result, time discrimination between different record traces is difficult, if not altogether impossible. In many instances this leads to ambiguity in determining the real cause of a disturbance or malfunction. Further, many items are monitored only by means of indicators and the station annunciator. The occurrence of system upsets or equipment failure inherently produces a period of stress for operating personnel, making it extremely difficult for them to record or mentally reconstruct an accurate picture of what took place. The monitoring function of the ADP system covers the following categories:

1. Major parameters in the steam and feedwater cycle, air and flue gas system and generator hydrogen-cooling system.
2. Equipment bearings for the turbine, generator and station major auxiliaries.
3. Electrical current for the station major auxiliaries.

Several features are of special interest. It is obvious, for example, that the normal value of certain parameters varies with load. Thus, main steam temperature, reheat steam temperature and flue-gas oxygen vary with main steam flow. High and low limits for such parameters, if they are to be meaningful, should be adjusted automatically to bracket the normal values of the parameters over that portion of the load range of operating interest. This function is accomplished by inclusion of limit curves in the computer program. The initial program is based on design curves. The curves will be modified from actual operating data when available.

Another feature of interest is the print-out of a sequence of related points whenever selected primary points exceed their programmed limits. The occurrence of high or low turbine throttle steam temperature, for example, will initiate a print-out on the off-normal log sheet of steam temperature, oxygen in flue gas, temperature of feedwater to economizer, and flow of main desuperheating water. Other

Computer System	
Analog Input Scanner	— mercury-wetted relay matrix
Memory Unit	
Type	— Magnetic drum
Size	— 8192 words
Ultimate Capacity	— 16,384 words
Word Length	— 19 binary bits plus 1 sign bit
Number Representation	— binary, fixed point
Instruction System	— single address and 1 + 1 address
Clock Speed	— 250 KC
Scan Rate	— 10 points per second, maximum
Readout Equipment	
Log Typewriter	— 30″ electric typewriter
Alarm Typewriter	— 30″ electric typewriter
Visual Display	— in-line digital indicator
Sensors and Transducers	
Flows, Pressures, Levels	— pneumatic transmission in general, with solid-state pneumatic-electric transducers for ADP
Temperatures	— thermocouples and resistance elements wired directly to ADP
Electrical Quantities	— thermal converters for ADP in conjunction with station current and potential transformers
Other Measurements	— retransmission by slidewires, movable-core transformers and other techniques

points have related sequences are turbine throttle pressure, steam-drum water level, and oxygen in flue gas.

A third feature of particular importance in any monitoring system is the ability to divide the scan cycle into appropriate sub-cycles in accordance with the degree of importance attached to the various classes of measurements. The computer program for Palo Seco is designed, for example, to monitor the temperature of each bearing on the turbine and generator every 15 seconds, important process variables every minute, and equipment bearing temperatures in general every five minutes.

Station Performance Monitored

The continuous availability of station performance indices permits operating personnel to make the necessary control-setting adjustments to maintain optimum performance of the station. The indices selected for Palo Seco are station heat rate, turbine-generator net heat rate and boiler efficiency. Each index is determined hourly and on-demand, and represents the actual value determined from operating conditions averaged over the past hour (four minutes for on-demand). Various factors are applied to the index to attain a corrected value, and the difference between the corrected value and a design value or "bogey" is determined. The actual value, corrected value and deviation for each index are recorded as a group. Correction curves and design or "bogey" curves are stored in the computer. The curves to be used initially are based on design information and will be revised as actual operating data becomes available.

Station heat rate is the ratio of the heat input to the boiler and the difference between generator output and station service requirements. The input-output method is used to compute the actual station heat rate.

$$\text{Station H.R.} = \frac{\text{Btu Input to Boiler}}{\text{Generator Net Kwh}}$$

Heat input is determined by metering boiler fuel flow and multiplying by the heating value of the fuel. The heating value is stored as a constant in the computer, and must be changed in accordance with

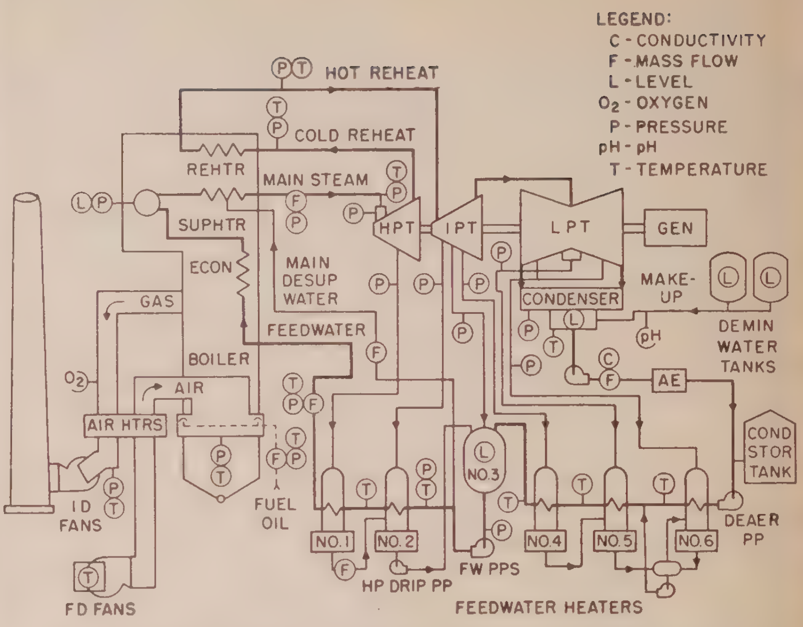


Fig. 1—Simplified diagram of process measurements by ADP system at Palo Seco Steam Plant.

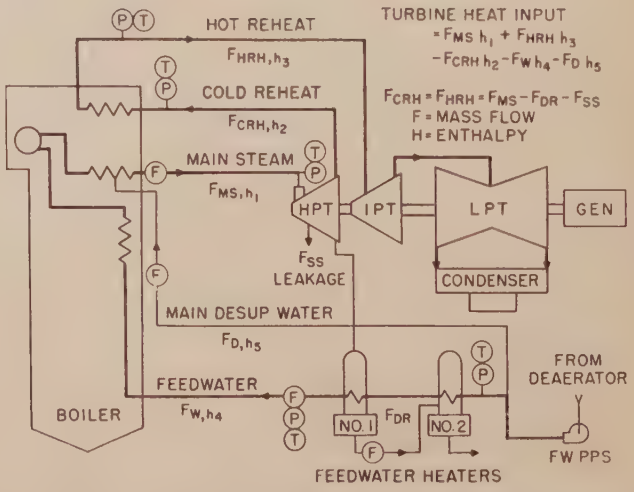


Fig. 2—Simplified diagram of the steam and feedwater cycle showing measurements used in determining turbine input.

periodic test data. Output is determined from the hourly (or four-minute) integrated values of generator and station service kwh measurements. The corrected heat rate is obtained by multiplying the actual heat rate by correction factors for condenser vacuum and boiler excess air.

Turbine-generator net heat rate is the ratio of the heat input to the turbine and the difference between generator output and station service requirements.

$$\text{Turbine-Generator Net H.R.} = \frac{\text{Btu Input to Turbine}}{\text{Generator Net Kwh}}$$

Heat input to the turbine is calculated from measured flow rates and enthalpies computed from pressure and temperature measurements for the following items: main steam, reheat steam, high-pressure heater drains, and main desuperheating water. Fig. 2 is a simplified diagram of the steam and feedwater cycle showing the measurements used in determining turbine input. Generator net kwh is the same quantity as discussed for station heat rate. The corrected heat rate is obtained by multiplying the actual heat rate by a correction factor for condenser vacuum.

Boiler efficiency is computed from the ratio of actual turbine-generator net heat rate and station heat rate. It is corrected for excess air.

Hourly Automatic Logging

The ADP program has been designed for hourly automatic logging of 77 measured and calculated quantities for each of two steam-generating units, off-normal logging of 104 measured and calculated quantities for each unit and on-demand logging for all quantities.

The hourly log is printed on a log sheet containing pre-printed columnar headings listing the time of entry, a description of each quantity, the engineering units in which each quanitity is recorded and its identification number. The hourly entry for Unit 1 is printed on a single line of the log sheet, and the Unit 2 entry appears on a second line immediately beneath the Unit 1 entry. An on-demand log for all points is recorded in the same manner as an hourly log. Quantities in excess of programmed high and/or low limits are recorded in red, all others in black.

For ease of numbering and assimilation, identical quantities for Unit 1 and Unit 2 use the same root number, with the respective unit identification as a prefix; e.g., 1-27, 2-34, etc. The unit designation is not required for the hourly log sheet since each unit uses a separate line on the sheet.

Except during the hourly log, print-out upon occurrence of an off-normal quantity takes place on the alarm typewriter, with time of occurrence, point identification and point value recorded in red. Normally an off-normal point will record once upon occurrence and a second time, in black, upon return to normal. If further records are required, the on-demand feature is used.

Future Growth of Automation at Palo Seco

The human operator finds it extremely difficult, particularly during periods of stress, to follow a lengthy procedure step-by-step, keeping all pertinent details firmly in mind. Machines are not handicapped in this manner, and hence can be of great assistance to an operator in this area. It is felt, therefore, that monitoring of start-up and shut-down operations is a logical next step in automation of Palo Seco Station. This is considered to be feasible on the basis that a large number of operating valves now include remote electrical control, the ADP system has a large memory capacity (8192 words now, ultimate of 16,384), and there now exists in the plant a transistorized sequence operations recorder capable of recording accurately the time of operation of relays, switches, circuit breakers and any other on-off device.

Start-up and shut-down sequences will be monitored through position switches and indicating and control devices to guide the operator in taking the correct sequential steps. Critical items such as machine expansions and temperature gradients will be monitored simultaneously. Departure from the established sequence or a critical item attaining a limiting value will initiate an alarm to advise the operator to take corrective action. Such a monitoring program is expected to prevent costly shutdowns caused by operating errors and undetected equipment malfunctioning. The prevention of a single accident can completely offset the cost of the monitoring equipment since the down-time of one unit is evaluated as a loss of $9000 per day.

Economic Considerations

The Palo Seco ADP system, as previously mentioned, was purchased on the basis of an experimental technology endowed with a promising future. In treating the economic analysis of an ADP system for power-plant application, one encounters the same class of problems associated with any young and growing industry or technology. Generally speaking, new products are met with a certain resistance from users employing well-established methods and procedures. This results in a period of trial and experimentation until the new product demonstrates acceptable performance at the same or lower capitalized cost than the equipment to be replaced. This fact places ADP in the role of a backup system to the conventional plant instruments and controls.

Experience obtained from ADP is expected to result in a substantial reduction of recorders and indicating instruments, as well as in the physical size of control boards, in future designs. The most important plant variables such as boiler pressure, superheated steam temperatures, boiler water level, main steam flow, and generator power, are always monitored by several independent channels of instrumentation. In the economic analysis that follows, however, no credit is taken for this added back-up protection provided by ADP nor for the cost of instruments that might be eliminated in future designs.

The main economic gains expected to result from the use of an ADP system will accrue from:

1. Higher plant operating efficiencies
2. Manpower reductions
3. Increased plant availability

Since the computer will calculate and record actual plant performance on an essentially continuous basis, the operating engineer can

ESTIMATED SAVINGS VERSUS COST FOR THE PALO SECO ADP SYSTEM

ANNUAL SAVINGS		ANNUAL COST	
Fuel (2 Units at $7500)	$15,000	Fixed Charges ($170,000 at 11%)	$18,700
Manpower	8,000	Maintenance and Operation	12,000
Reduction in Conventional Instruments	No credit		
Increased Plant Availability	No credit		
Intangible Gains	No credit		
Total Evaluated Savings	$23,000	Total Annual Cost	$30,000

readily trim plant controls for optimum efficiency. It is estimated that at full-load operation this may result in a gain of at least ¼% in plant efficiency, thus producing a reduction of at least 50 Btu/kwh in the station heat rate.

Cost of fuel in Puerto Rico can be taken at 35¢ per million Btu. A conservative daily loading schedule for each of the Palo Seco units can be taken as follows, giving a load factor of 76.7%:

80 mw for 6 hours
65 mw for 6 hours
50 mw for 12 hours

At 65 mw and 50 mw operation, approximately 85% and 70% respectively, of the ¼% efficiency gain can be expected. The daily savings in fuel cost per unit thus becomes:

$$\frac{[(80{,}000)(6)\ \ (65{,}000)(6)(0.85)\ \ (50{,}000)(12)(0.7)](50)(0.35)}{10^6} = \$21.55 \text{ per day}$$

Taking 350 operating days per year the net yearly fuel savings per unit is approximately $7500.

Concerning manpower, an approximate guess can be made of the clerical, technical and engineering manhours that will be saved by use of an ADP system. To realize an actual monetary savings, these manhours must be reflected in a reduction in personnel requirements for Palo Seco compared with similar plants in the PRWRA system. PRWRA believes that the manhours so released will represent a true savings.

It is estimated that clerical work devoted to reading, logging, classifying and storing plant information will be reduced by 2000 manhours yearly, producing an annual savings of $4000. Engineering manhours spent in calculating and supervising plant performance and other calculations are estimated at 1000 manhours yearly, giving an additional annual savings of $4000. Trouble-shooting time is expected to be greatly reduced but cannot be estimated at present.

It is fully expected that increased plant availability will result from effective use of an ADP system. There have been instances in the past where the reasons for malfunction of plant components have never been traced accurately. Production of an accurate station log and continuous monitoring of off-normal variables should result in early pinpointing of troubles, permitting more timely and effective maintenance procedures.

The accomplishment of planned maintenance in accordance with a known degeneration in performance rather than on an arbitrary schedule, and a reduction in the necessity for emergency maintenance will effect an increase in plant availability. At present there is no sound basis for estimating the savings from this source. It could easily result in gains higher than those already discussed.

Based on an installed cost of $170,000 fixed charges of 11%, and an estimated annual maintenance and operating cost of $12,000, a comparison of estimated savings versus cost for the Palo Seco ADP system is summarized in Table I.

The figures given in Table I indicate that the ADP system will not pay for itself solely on the basis of those considerations evaluated. However, the difference between annual cost and savings is not large. An annual increase in availability of as little as one-half day per unit will more than offset this difference.

Russia Lags in Power, SEE Engineers Told

Russia is far behind us in the availability of electric power and in the use of mechanical power. This was the message of Senator Barry Goldwater (R-Ariz),—also of J. L. Singleton, senior vice president of Allis Chalmers, in addressing more than 450 engineers and manufacturers' representatives attending the Engineering and Operation Section Conference of the Southeastern Electric Exchange in Washington, D. C., October 20-21.

Senator Goldwater said that the superiority of the United States is increasing, not decreasing. "Is it losing a race in industrial supremacy to the USSR when we still generate and use three-and-a-quarter times as much electric energy?" he asked.

Mr. Singleton said that we have three times Russia's power generating capability. But we must be alert to those proponents of "something for nothing subtleties" if we are going to stay head of the Soviet threat in THE CHALLENGING SIXTIES, he warned.

Civilian Defense Role

In discussing the role of electric utilities in civilian defense, Edward Frye, Assistant to the Secretary of the Interior, asserted that any utility with facilities under construction, or on the planning board, that has not provided for shelter is negligent in its duty to itself, its employees and the nation. He maintained that fall-out shelters provide the best single non-military defense measure for the protection of the greatest number of people. There is no reason why utilities should not plan on utilizing their own communications during an emergency, Frye declared.

EHV Transmission

Dr. P. A. Abetti, General Electric Co., said that the lightning performance of EHV lines can now be predicted with confidence and that lightning normally will not be the determining factor in establishing the insulation level. Internal overvoltages, rather than external overvoltages, are becoming more and more the determining factor for line and station design, he added. Dr. Abetti stated that test results at Pittsfield indicate that, unless switching surges are drastically controlled, it may not be possible to build transmission lines to operate above 1,000 kv ac.

Cardiac Massage

According to Dr. W. B. Kouwenhoven, John Hopkins University, anyone, anywhere, can now initiate cardiac resuscitative procedures. All that is needed are two hands. He showed a motion picture which demonstrated a method of closed-chest cardiac massage which has proved effective in cases of electric shock. The use of this technique on 20 patients has given an over-all permanent survival rate of 70%, Dr. Kouwenhoven emphasized. This technique eliminates the necessity of opening the chest to massage the heart directly. Its real value lies in the fact that it can be used whereever the emergency arises, whether that is in or out of the hospital, he contended.

Address welcoming SEE conferees is made by R. Roy Dunn, president of Potomac Electric, as L. J. Cucullu, vice president of New Orleans Public Service and conference chairman, and J. S. Singleton, vice president of Allis-Chalmers look on.

Designing Residential Underground

Residential underground will probably continue to cost more than overhead for some time to come, in the opinion of R. H. Stevens, Florida Power & Light Co. Underground costs can be reduced by careful design and the application of mass installation techniques. He said that initial costs can also be reduced at the expense of increased maintenance cost and sacrifice of service continuity. Development of more reliable primary cables will assist in reduction of costs because this will encourage direct burial systems and also reduce the requirements for sectionalizing points.

In commenting on Stevens' discussion, Frank E. Johnson, Jr., New Orleans Public Service, Inc., suggested the desirability of providing a ready means of transformer changeout ot a larger size without disturbing the external cable connections. He also suggested that an arrangement could be worked out whereby conventional overhead type transformers could be used in back of the connections and switch panel for increased flexibility and savings over the present design using a special transformer.

Housepower Panels

The Housepower Panel Program of Duke Power Co. has been a wonderful tool for getting conversions to electric heating systems, according to P. D. Huff. He said that this program was initiated on May 1, 1960, and that through September, 923 all-electric customers were added—compared with 485 for the same period of last year. Savings up to $291 in the home owners' wiring cost were indicated when the housepower panel was used as compared to conventional wiring, and service entrance practices, he stated. Average saving was about $150.

M. L. Cathey, in discussing Georgia Power Company's Housepower Panel Program, said they had 100% cooperation from electrical contractors. There has been no change in their manner of doing business except that they do more business, he added. In the first eight months of the program 3,457 ranges, 2,208 water heaters, 1,027 clothes dryers and 715 complete electric heating systems were installed, in addition to the Company's regular load growth. These were attributed entirely to this Program, Cathey declared. These 5,297 jobs are completed jobs only. The number now in progress will probably double these figures, he said.

Alabama Power Company's Housepower program has had good acceptance from appliance dealers, contractors, home owners and builders, asserted D. D. Wendel, vice president. It has simplified and lowered the cost of adequate service entrance wiring—and is gathering momentum. During the first three months, from April 1, 1960, there was an average of 513 installations per month. By September this had increased to 1,217 per month, Wendel said. During this six-month period, appliances added in connection with the program were: 2,947 ranges, 1,714 water heaters, 1,614 dryers, 277 resistance heated homes and 402 heat pumps. A great deal of this load resulted from the program, he emphasized.

Aerial Baskets

C. Clyde Crockett, Louisiana Power & Light Co. reported that his Company saves enough in man-hours cost through increased production in tree trimming to pay for an aerial basket every two years. If it is used in hot line work, it is paid for in less than one year, he stated. Crockett advised not to look at the initial cost, but to look at the net savings as compared to the initial cost. In order to get the most for the money in the use of these baskets, he said, they must be equipped with all the powered hand tools necessary for the job. These tools account for a very large part of the total savings, he asserted.

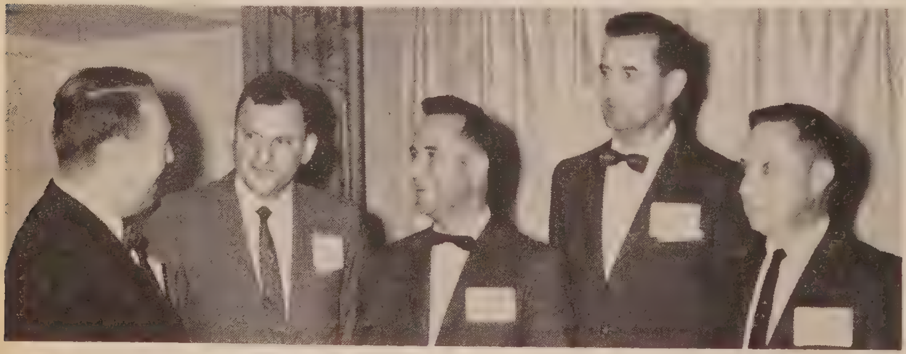
Distribution engineers should take a new look at banked secondaries for improving the operation of secondary distribution systems, asserted Henry J. Ford, City Public Service Board, San Antonio, Texas. Their advantages can now be realized without the disadvantages of solid secondary or fused junctions, he said. An automatic circuit breaker installed at junction points solved the problem of blown junction fuses which were previously used. In case of a secondary fault or overload, the transformer fuse blows and the breakers in the secondary connected to that transformer open. When the trouble is cleared and the transformer refused, the secondary on both sides of the breaker is energized, he added. The voltage across the voltage coil drops to almost nothing and the contacts drop closed.

Distribution Transformer Economics

The higher thermal capacity rating of distribution transformers cannot in itself affect industry practice too much, in the opinion of A. L. Baxter, Allis-Chalmers. But combined with lower impedance, higher short circuit strength, fewer ratings, and different loss ratio, the unit is then tailored for the type of loads handled now and which will be handled in the future, that will do a better job at a lower overall cost, he said.

If there is some degree of load growth evident, then it is probable that economics favor omission of 15- and 37.5-kva transformers, declared James O. Sweeny, General Electric. In the usual system, normal changeouts should provide enough of these two sizes to satisfy requirements where no load growth exists, and it is most economical to size the transformer to the load. There will be many utilities which could

Large Substations and Transmission Committee Chairman C. B. Benham, Florida Power Corp.; with speakers R. A. Mouton, New Orleans Public Service, Inc.; Dr. P. A. Abetti, General Electric Co.; M. M. Bostian, Tampa Electric Co.; and H. H. Strozier, Georgia Power Co.



Distribution Committee Chairman C. B. Miller, Duke Power Co. (2nd from left at rear); with speakers M. L. Cathey, Georgia Power Co.; R. H. Stevens, Florida Power & Light Co.; P. D. Huff, Duke Power Co.; and D. D. Wendel, vice president, Alabama Power Co.

gain by the omission of the 75-kva transformer, Sweeny said.

In describing the effect of loading and loss ratio on the cost of losses in distribution transformers, A. M. Lockie and R. E. Rood, Westinghouse Electric, derived explicit formulas for this purpose. These formulas and other considerations indicate that substantial decreases in operating costs may be effected by reduction in loss ratios, if the price of the transformer is not increased. Manufacture of such transformers may be justified on the basis of a higher rated-load temperature rise, they said.

Reducing Fuel Cycle Costs

In discussing how to reduce fuel cycle costs in nuclear plants, Dr. H. C. Ott, Ebasco Services, Inc. said that the "trick" is to get the heat out of the uranium in a practical way without allowing all the associated costs of the fuel cycle to make it impractical. L. F. C. Reichle, also of Ebasco, authored the paper. Dr. Ott declared that the objectives of such a cost reduction program are to achieve (a) maximum burnup of fuel elements, (b) minimum fabrication cost, (c) adequate radiological safety, (d) low processing cost, (e) high conversion or breeding ratio, (f) high temperature operation, and, (g) ease of handling and shipping.

115-kv Urban Transmission

A new design, better-appearing steel pole for 115-kv transmission in urban areas costs approximately the same as the previously-used wood pole, asserted R. A. Mouton, New Orleans Public Service, Inc. This new design, however, costs only about one-seventh that of comparable underground construction, he said.

Aluminum Guyed Towers

Recent field investigations of new transmission line construction techniques have proven the practicality of picking up completely assembled high voltage aluminum guyed towers by helicopters, transporting them from the yard to the site, and in one operation completing the erection of tower, using the helicopter as a hovering winch, said H. B. White, Aluminum Co. of Canada, Ltd. There are a number of lines where this type of erection could be justified with present techniques and costs, he asserted.

Direct-burial substation control cable is economical to install, flexible, not easily outgrown, lends itself to expansion in any direction, and is liked by company installation and operating crews alike, according to Marvin Bostian, Tampa Electric Co. No economical method of installing overhead cable trays was found that would permit easy access to all equipment. Only in special conditions should the overhead cable tray be considered, he added.

Reduced BIL

As voltages go higher, economics will force transmission line and substation BIL reduction to minimum safe levels, declared H. H. Strozier, Georgia Power Co. Ultimate reductions will result in a thorough understanding of switching surge phenomenon. Two avenues of progress appear possible, he said: 1.—reduction of switching surge magnitude by use of resistors in circuit breakers and disconnecting switches; 2.—further improvements in lightning arrestors.

The basic price of aluminum structural alloys has decreased and design development has reduced fabrication and erection costs, said J. J. J. Schlass, Kaiser Aluminum & Chemical Sales. The sum of these provides lower first cost and always lower maintenance and freedom from costly outages. Design improvements can be applied to other materials, but aluminum will be a better partner to the newer designs, Schlass stressed.

In describing the G-E transformer Fault Pressure Relay, H. A. Fohrhaltz said that it can be used on all types of oil preservation systems and that it furnishes inexpensive protection from internal faults for all units, large or small, with either simple or complex winding arrangements. He asserted that it has been modified immediately when field experience proved it to be deficient in a particular area.

Temperature elevation of waters is becoming an important consideration in the granting of water-use permits to electric utilities, warned L. W. Cadwallader, vice president Potomac Electric Power Co. He urged utilities to make use of the best talent available in determining new plant locations since there are many variables to be considered.

Brushless Excitation

Chas. L. Wagner, Westinghouse Electric, discussed a new silicon diode brushless rotating rectifier exciter system which he said would eliminate the need for reserve or spare excitation in power stations. Generator field breakers, which were utilized primarily for transfer of excitation sources, will no longer be required and bulky exciter field rheostats can also be eliminated, he claimed. All this will result in a savings of space and capital, he predicted.

Decentralized peaking power presents the greatest opportunity for reduction in revenue requirements, according to Fred W. Walker, Electro-Motive Division, General Motors Corp., who presented a paper prepared by B. H. Hefner. He stated that added reductions in revenue requirements can be obtained through decentralization of generation. With location at point of load, as opposed to central station use, substantial additional

Production Committee Chairman J. A. Keene, Alabama Power Co. (right), with Speakers H. J. Guillory, Central Louisiana Electric Co.; C. L. Wagner, Westinghouse Electric Corp., Fred W. Walker, Electro-Motive Division of General Motors Corp.; and L. W. Cadwallader, vice president, Potomac Electric Power Co.

savings become possible through deferment and/or reduction in line investment, adjustment in capacity for line losses and reductions in fuel expense through reductions in preparation for peak and operation of unloaded capacity for spinning reserve, Walker added.

Transformer Loading Practices Emphasized At PEA T&D Meeting

How to get the maximum number of practical, economical, and reliable kilowatt hours per kva of transformer capacity installed, was the major subject of discussion at the Pennsylvania Electric Association's Transmission and Distribution Committee meeting held in Hagerstown, Maryland, October 27-28, and attended by 170 members, guests and manufacturer's representatives.

A. A. Jedrziewski, West Penn Power Co., who sponsored the session on distribution transformer loading practices, said there is a lack of agreement on whether loading should be on a thermal or voltage basis or on the presently-popular economic basis. However, there is not too much difference in end results produced by any of them, he added. Utilities may depend upon the manufacturers for help in solving transformer application and loading problems, but should not depend upon them for the final answers. In a similar manner, the final decisions in transformer design should be made by the manufacturers, Jedrziewski asserted.

Company Practices

In order to provide quick temporary relief for overloaded transformers, Duquesne Light Co. has experimented with some lightweight blower-type fans which can be readily installed by a troubleman, said W. P. Cook. They reduce customer outage to a minimum, provide time for a thorough investigation of the overload and permit corrective measures to be taken during regularly scheduled working time. An annual savings in excess of \$3600 is accomplished by the use of these fans, based on an average crew cost of \$60 for a transformer change by a three-man crew on premium time, Cook estimated. In addition, outage time for the customer involved is reduced from four to six hours to approximately ½ hour. This results in a revenue saving as well as improved customer relations, he declared.

E. Huston, Pennsylvania Electric Co., said that use of overload indicators by Penelec over a period of two years did not produce encouraging results. Where a load growth of 10-percent per year is expected, it is not economical to install a large transformer initially. During the first years when the larger transformers are underloaded, the cost of operation is higher than with the smaller transformers. Since the cost per kwhr delivered decreases as the load increases there is a considerable reduction in costs during the later years of operation which offset the higher costs incurred during the first years of operation, he stated.

According to R. S. Diggs, Philadelphia Electric Co. uses a figure of 1½ kva per residential customer for sizing new transformer installations. For seven customers a 15-kva is used; 8-17 customers, 25-kva; 18-30, 37½-kva; 31-38, 50-kva; above 38, a 75-kva or preferably two 37½-kva transformers. Diggs said that his company has not been able to establish a satisfactory working relationship between kw and kwhrs in loading transformers, especially since meters are read on three-month intervals. He described a new ampere measuring device they are testing which cost about \$15 and "has good possibilities." It is installed on a transformer primary wire and is read from the ground using binoculars, Diggs stated. Results are much more accurate than those using the conventional overload indicators, he added.

Overload Indicators

Potomac Edison Co., has been purchasing transformers (10 kva and larger) with overload indicators since 1951, according to C. C. Wolf. Transformer sizes for new installations are determined by using curves and data developed by the Company. Unless some transient or temporary cause of overload is suspected, all transformers on which the overload indicator has operated, are replaced with a larger size, Wolf said. No Max-I-Meter check is made unless there is some reason to believe the overload indicator is not operating properly.

Kwhr Method Best

West Penn Power Co. has improved its distribution transformer loading performance by using the kwhr method, in the opinion of A. W. Scheib. It is the best tool available to do the job and West Penn will continue to use it until a better one comes along, he added. There has been no increase in the transformer failure rate—it is still less than one-half of one percent for all causes, Scheib stated. This method permits seeking out and correcting transformer load conditions—not only those which cause customer dissatisfaction, but also

Distribution transformer loading practices were discussed by this panel of experts including (l to r) A. A. Jedrziewski, West Penn Power Co., sponsor; W. P. Cook, Duquesne Light Co., E. Huston, Pennsylvania Electric Co.; R. S. Diggs, Philadelphia Electric Co., Committee Chairman; C. C. Wolf, Potomac Edison Co.; and A. W. Scheib, West Penn Power Co.

Summer safety program, "Operation Safety" is described by E. J. Miller (center), System Safety Engineer, Pennsylvania Electric Co.; to P. M. Horst, Jr., Potomac Edison Co.; R. S. Diggs, Philadelphia Electric Co., Committee Chairman; A. Lewis, West Penn Power Co., Committee Vice Chairman; and C. C. Wolf, Potomac Edison Co.

those which are wasteful of transformer capacity, he declared.

Safety Program

Earl J. Miller, safety director, Pennsylvania Electric Co., in describing how his company's successful safety program functions, said that 88-percent of electric utility employee accidents result from unsafe work practices. The Penelec direct target has and will continue to be directed toward employee work habits, practices, and attitudes. He contended that their 10-point safety program has been largely responsible for Penelec's outstanding safety record—a 1.61 frequency rate for 1959 compared with the electric utility industry average of 6.6—its lowest in history.

Henry H. Startzman, vice president Potomac Edison Co., urged utilities to carefully watch all new zoning so that unreasonable requirements do not become an integral part of the regulations. It is much easier to keep such restrictions out of contemplated regulations than it is to have them removed after the zoning law is passed, he warned.

Railroad Rights-of-Way

Railroad rights-of-way should not be used for utility company transmission lines unless there is a good economic reason—such as an alternate to underground construction. This was the advice of S. H. Farace, Philadelphia Electric Co. The cost is about double that of a private right-of-way, he said, but only one-half the cost of underground.

SALES TRAINING . . .

(Continued from page 54)

program designed to entertain. The program included the election of a class president, presentation of "diplomas" by the general sales manager, and a five-minute skit by two members of the class in which they gave a backward demonstration of the "skills" learned during the course.

Accomplishments

We feel, and our management feels, that the course accomplished what it set out to accomplish. There is a new awareness of the important role to be played by the salesman in our economy. There is a new feeling of personal pride being exhibited by the men, pride in the job they are doing, pride in the importance of their work in the total success of the sales operation. There has been an increase in sales results. Our Leads to Dealers program is at a record high and our Planned Lighting activity is far ahead of last year in quality of installations. Finally, even though other areas of accomplishment cannot be measured as easily, it is felt that long-range results will be comparable.

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SERVING 2 GREAT GROWTH INDUSTRIES—*ELECTRICAL . . . AUTOMOTIVE*

RCA Introduces New Computer Rental System

A new leasing plan better suited to the needs of individual users of RCA electronic data processing equipment has been announced by the Radio Corporation of America. The new plan is a major departure from conventional rental systems now in effect in the EDP industry.

According to Donald H. Kunnsman, vice president and general manager of RCA's Electronic Data Processing division, the plan provides new economies in costs of operation for customers through four different rental agreements. The new plan will apply to RCA 301 and 601 systems going into use in 1961 as well as to the RCA 501.

"The new lease arrangements set basic monthly charges for different combinations of work requirements, resulting in a decrease in cost per unit as the work load increases."

The four rental plans are designated (1) unlimited availability, providing equipment seven days a week, around the clock, at a cost of 30 percent over the single shift rental; (2) extended availability, providing around-the-clock use of the equipment, five days a week, at a cost 20 percent above the single shift rate; (3) random use, providing the customer with 200 hours of equipment use per month, at the users option, at a basic charge of three percent over the single shift rental; and (4) single shift availability, providing eight consecutive hours of equipment use per day, five consecutive days per week.

Mr. Kunnsman pointed out that under the unlimited availability plan, a customer can obtain 200 percent more time than under the current single shift agreement at a cost increase of only 30 percent.

This, he said, is an important change from the arbitrary standard rental-plus-overtime system prevalent throughout the EDP industry.

Million-Kw Generators To Come Soon: Westinghouse's Baldwin

Turbine-generators rated at one-million kw, twice as large as any now in use, may be producing power in the United States within 15 years, according to the predictions of a Westinghouse engineer.

Clarence J. Baldwin, a utility engineer at Westinghouse's East Pittsburgh plant, and co-author of the current Program For Planning series appearing in EL&P, reported the increases foreseen in generator ratings in a paper presented to the recent AIEE fall general meeting.

Mr. Baldwin said that Westinghouse has determined that the higher rated units can be economically operated during a two-year study of the problem using a method called "Powercasting," employing computers to simulate detailed operations of a utility in the future.

Among other things, the study included comparison of a number of feasible expansion patterns for the system.

"The one-million kw pattern proved economically superior to one restricted to 500,000-kw units over the next 20 years," he reported. "Its economic was unchanged by variations in installed plant cost.

"The study showed that patterns using units larger than 1.5-million kw could be economical were it not for increasing internal transmission costs with the very large units. The 1.5-million kw units would not be excessively large as far as reserves are concerned," he said.

Mr. Baldwin went on to explain that concentrations of capacity in one location on some systems would increase transmission costs enough to overcome the economies of the 1.5-million kw unit.

Extra-high-voltage transmission was not studied as a means of reducing these costs, although some utilities may find it economic to use these higher voltages in the near future, the Westinghouse engineer stated.

Westinghouse has already developed an 800,000-kw turbine generator at its South Philadelphia plant, and will be, according to Mr. Baldwin, ready to build a one-million kw unit when the demand arises.

Heat Pump Ideal For West Coast: Wood

The air source heat pump will soon have even broader acceptance as "the ideal year round air conditioning system for the West Coast," according to a prediction by Fred C. Wood, manager of air conditioning sales for the York division of Borg Warner Corp.

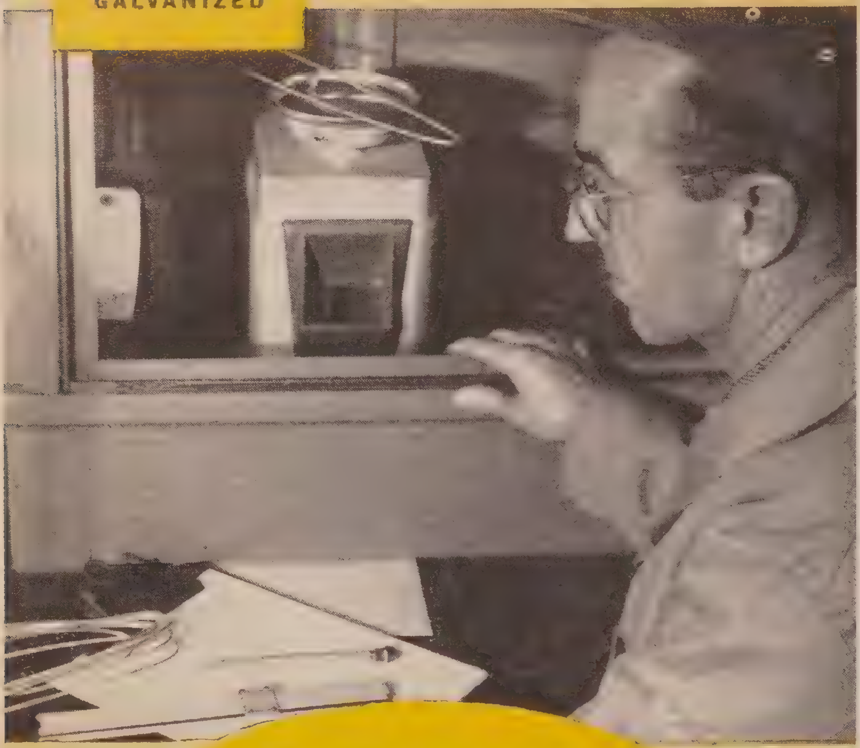
Mr. Wood also pointed out that the heat pump is the ready-made solution to a part of the smog and air pollution problems found in some sections of the country. Because there is no combustion, there are no gases, smoke, or soot discharged into the atmosphere during either the heating or cooling season.

Speaking to the Southern California chapter of the American Society of Heating, Refrigeration, and Air Conditioning Engineers in Los Angeles recently, Mr. Wood discussed the practicability and increasing nation-wide acceptability of refrigeration cycle heat pumps for year round air conditioning of large and small commercial buildings.

Mr. Wood told the group of the overall economies of the heat pump, both in initial and operating costs. He said that this "is particularly true for the West Coast where mild

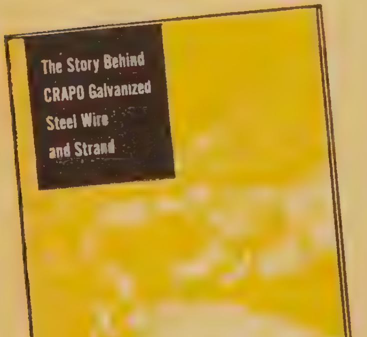
(Continued on page 90)

Crapo
GALVANIZED
STEEL STRAND



WEIGHT OF COATING TEST

...added assurance of dependability



The life of galvanized steel strand depends primarily upon the weight and quality of the zinc coating. The heavier the coating the longer the strand will last.

The wire used in CRAPO Galvanized Steel Strand is regularly subjected to the hydrochloric acid antimony chloride, or weight of coating, test. By means of this test the amount of zinc on the surface of the wire can be accurately measured.

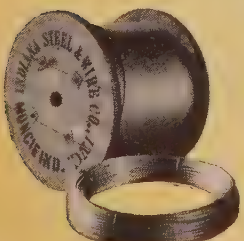
This is but one of the many laboratory tests to assure consistently high, dependable quality in the finished product.

AVAILABLE IN 3 COATING WEIGHTS

CRAPO Steel Strand is regularly furnished in all standard sizes and grades and in Class A, B and C coatings. Class B coating is twice as heavy as Class A coating; Class C coating is three times as heavy.

Write for this FREE BOOKLET!

"The Story Behind CRAPO Galvanized Wire and Strand" describes and illustrates manufacturing and testing techniques. Ask for Booklet B-59!



INDIANA STEEL & WIRE CO., INC.
Muncie, Indiana

Heat Pumps (Cont'd)

climates permit single stage refrigeration compression equipment in place of the more expensive compound compression required in colder climates where temperatures reach zero and below.

The most noteworthy installation made in the recent past on the west coast was at the Squaw Valley Winter Olympics facilities, where 1,200 hp of motor driven refrigeration equipment performed the many functions of freezing the ice of the large Arena rink, the 400 meter speed oval, two practice rinks, heating the spectator areas, providing domestic hot water and melting up to 450 inches of snow a season off of the vast arena roof. Heat for all these processes was extracted from the ice in the process of freezing it, and from the outside air.

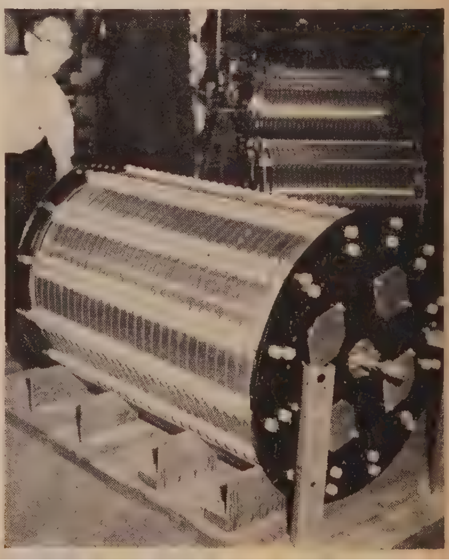
Alaska's First Carrier Current System To Be Installed

The first carrier-current communication system to be installed in Alaska has been shipped to the Chugach Electric Association, Inc., for Cooper Lake Electric Power Project at Anchorage.

The shipment includes 12 all-transistorized impulse channels and one voice channel. Built by General Electric, the equipment also has channels for telemetering, supervisory control of switches and circuit breakers, and transfer-trip relaying.

The system will connect two substations and the Knick Arm Steam Plant with the Cooper Powerhouse in the 71-mile system.

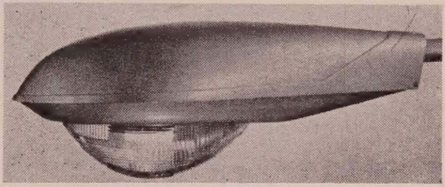
First carrier-current communication system built for use in Alaska is on its way to Chugach Electric Association, Inc. Shown above is a line trap for the 12 impulse-type and one voice channel system.

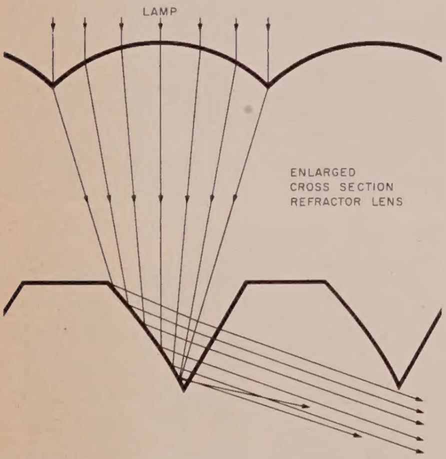


NEW PRODUCT DESIGN

Residential Luminaire Improved, Directs Light to Street

A mercury vapor luminaire designed to increase street lighting efficiency and turn brightness away from house windows has been introduced by **General Electric.** Unit operates with 100-, 175-, or 250-watt mercury vapor bulbs and is said to give three times the light and six times the life of filament units of the same wattage. Photometric efficiency of the unit was achieved by introducing curved surfaces to the refractor lens prism, allowing a 70° bend to the light ray emission. The greater angle turns light away from house windows and directs it toward the street. The new unit contains all the operating benefits of GE's Type M line, the inherent efficiency of mercury vapor lighting and sleek appearance required by today's residential communities, according to C. J. Meloun, outdoor lamp dept. marketing manager.



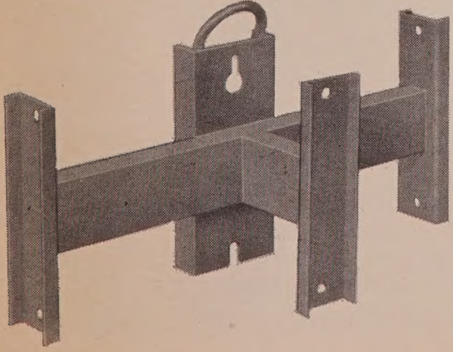


Circle item #1 on reply card

Cluster Mounts

A rack permitting oil circuit reclosers to be mounted in the shop and then hoisted into position in the field has been manufactured by **Turner Electric Co.** For maintenance or inspection purposes, the entire bank may be removed and replaced so that outage time is minimized. A NEMA type arrester can be attached to each channel for protection. Rack can be used to mount 5 kva through 25 kva transformers also.

Circle item #2 on reply card



Extension Anchor

A screw anchor which can be installed to any depth in soft soils has been developed by **A. B. Chance Co.** Consists of forged steel rod, helix, coupling nut and stud. Stud is removed after anchor has been installed and the extension rod takes its place. The stud is then screwed into the coupling nut at the other end of the extension rod and the anchoring job is ready to continue. No wrench is necessary.

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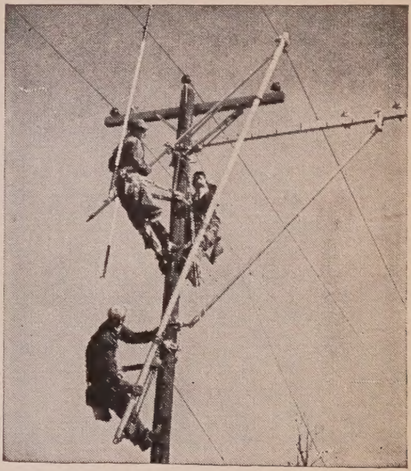
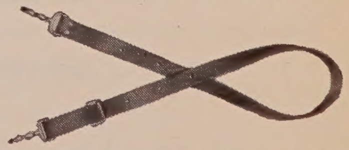
Bashlin's
Quality
FOR OVER 30 YEARS



TOOLS OF SAFETY . . .

BASHLIN Quality Body Belts with the additional Nylon Safety Feature . . . Work Safely . . . Comfortably . . . with tools in easy reach.

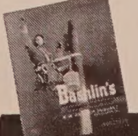
BASHLIN Quality Alcoa Aluminum Alloy Adjustable Climbers with replaceable gaffs . . . There is nothing better anywhere!



BASHLIN'S Nylon and leather Safety Straps . . . Bashlin Quality, of course.

You Can't Afford Anything LESS Than the BEST—
Buy BASHLIN
Highest Quality For Over 30 Years
Distributors in Strategic Areas in U.S.A.

EXPORT: Copperweld Steel International Co.
IN CANADA: A. B. Chance Co. of Canada, Ltd., Toronto



Ask for . . .
CATALOG NO. 156

W. M. BASHLIN CO.
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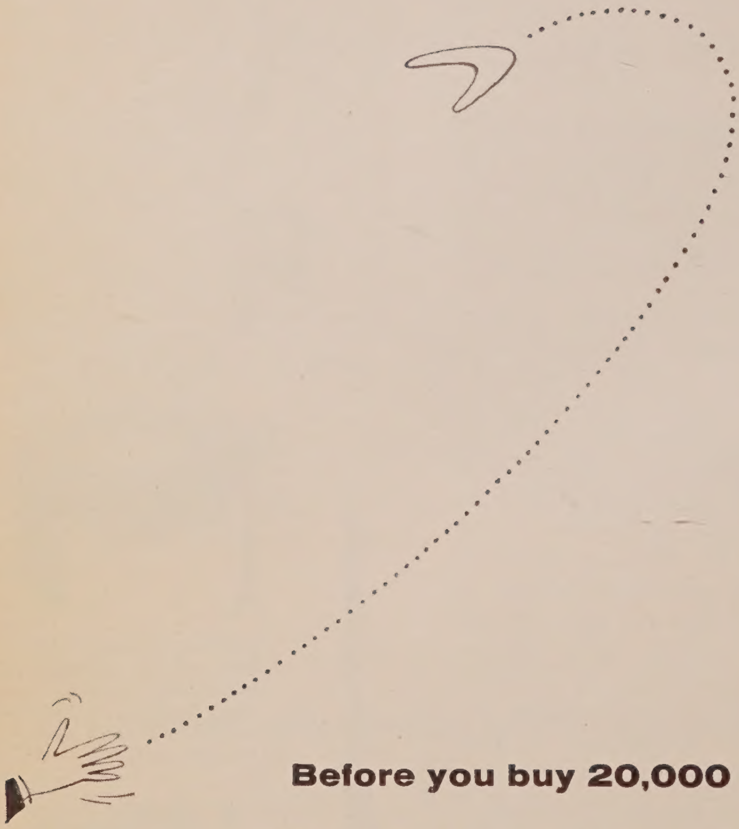

Before you buy 20,000 "throw-away" photocontrols because they're inexpensive, consider:

did you ever try to throw away a boomerang?

If you can't afford to replace a few thousand poorly-made photocontrols when they fail two or three years after installation, you can't afford the "savings" of their low first price. The Fisher-Pierce Co., 81 Pearl St., So. Braintree 85, Mass.

FP
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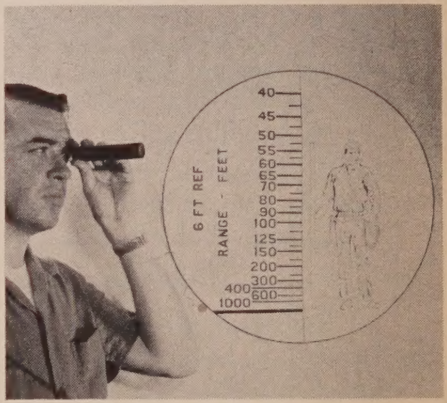
Electrical and Electronic Equipment
for Industry, Utilities and the Home
AN AFFILIATE OF SIGMA INSTRUMENTS, INC.

Pocket-Sized Surveyor

Distances from 40 up to 1000 ft can be read directly off the calibrated scale of this "survey scope," using a 6-ft reference height (man, rod, tree, etc.). Especially handy for engineers and construction men where terrain, time, and circumstances prohibit measurement by other means. Unit is pocket-sized and built to withstand rugged handling. Manufactured by **Vexilar Engineering Co.**

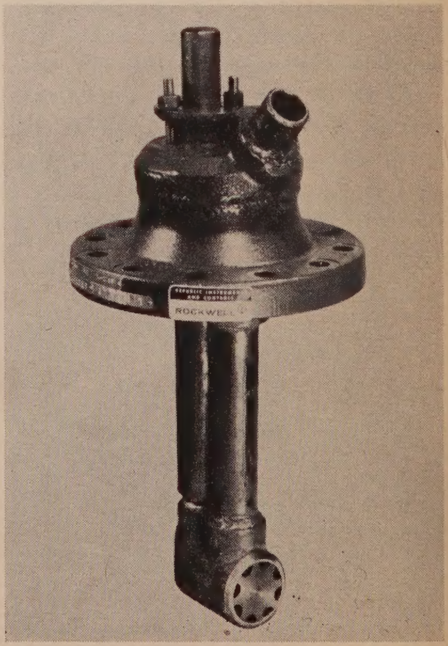
Circle item #4 on reply card



Desuperheater

Model SA-30 steam-atomizing desuperheater gives constant atomization of cooling water, regardless of steam header flow rate. By **Republic Flow Meters Co.,** the desuperheater is available in 300-, 600-, 900-, and 1500-lb classes with mounting flanges of 3, 4, 6, and 8 in. Utilizes an independent source of high pressure steam for atomization to produce a uniform cooling spray, regardless of steam header flow.

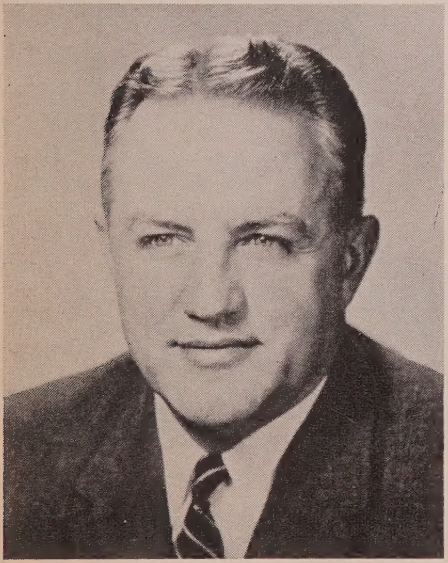
Circle item #5 on reply card



MEN OF POWER

PGE's Arnett To G-E Atomic Post

Howard Arnett, vice president of Portland General Electric Co., has left the west coast utility to assume the post of manager-domestic power reactor sales for General Electric Co.'s Atomic Power Equipment Department.

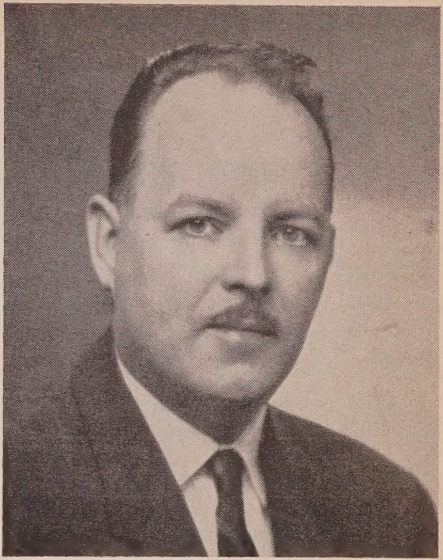


Mr. Arnett will direct APED's sales force in marketing the department's line of nuclear power reactors for electric power generation in this country. He has been with the Oregon utility for almost 21 years.

Mr. Arnett has been vice president in charge of overall coordination of PGE's sales department and customer service division since 1956, and prior to that was executive assistant to the chairman of the board. Before being appointed to the latter position in 1955, he was assistant general superintendent.

Mr. Arnett originally joined PGE as a meterman in 1936 and rose through the ranks to assistant engineer before entering the U. S. Navy in June, 1942. Released from service in December, 1945, he returned to PGE as an engineer in the engineering division and was named purchasing agent in 1947.

Niemi CE V.P.



Robert A. Niemi, formerly director of manufacturing, has been elected vice president-manufacturing, of Combustion Engineering, Inc.

In his new office Mr. Niemi will have full executive responsibility for manufacturing, purchasing, production planning and industrial engineering. He will make his headquarters in the company's general offices at Windsor, Connecticut.

Combustion manufactures steam generating equipment and nuclear products and has plants in Chattanooga, Tenn.; Windsor, Conn.; Monongahela, Pa.; East Chicago, Ind.; and St. Louis, Mo.

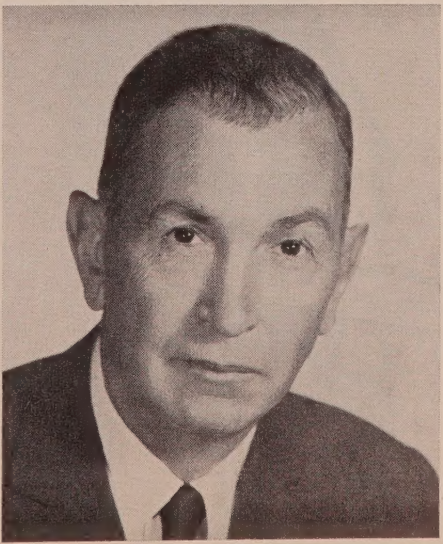
Announce Three Kaiser Appointments

Elevation of John L. Hallett and Louis H. Oppenheim as vice presidents of Kaiser Industries Corp., and of Franklin T. Matthias as vice president of Henry J. Kaiser Co., was announced recently by Edgar F. Kaiser, president of both organizations.

Mr. Hallett is general manager of Kaiser Engineers International, a division of the Henry J. Kaiser Co., of which he is a vice president also. He joined the Kaiser organization in 1938 as an engineer on heavy construction projects and subsequently was associated with Kaiser enterprises in other fields. During the past two years he was assistant general manager of Kaiser's heavy construction projects overseas.

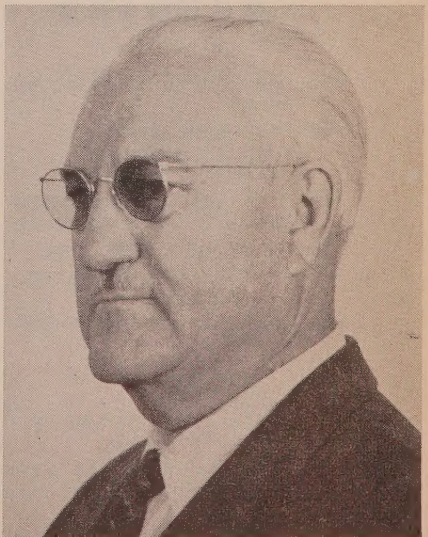
Mr. Oppenheim is general manager of Kaiser Engineers and a vice president of Henry J. Kaiser Co. He has been with the company since 1938, assuming the position of general manager in 1958.

(Continued on page 96)



J. L. Hallett

Nation's Top Power Sales Engineer Honored



B. J. George, Sr., a sales consultant with Kansas City Power & Light Co. has been selected as the first gold award winner of the national "Power-Up Achievement Award" established by Westinghouse.

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MEN OF POWER BRIEFS

Arkansas-Missouri Power has appointed **William L. Lovelace** acting personnel director.

John V. Vinciguerra has been named director-Office of Contract Policy, for the Atomic Energy Commission.

Carolinas Virginia Nuclear Power Association has elected **S. C. McMeekin,** president, South Carolina Electric & Gas, president, and **O. J. Miller,** executive vice president, Duke Power Co., executive vice president.

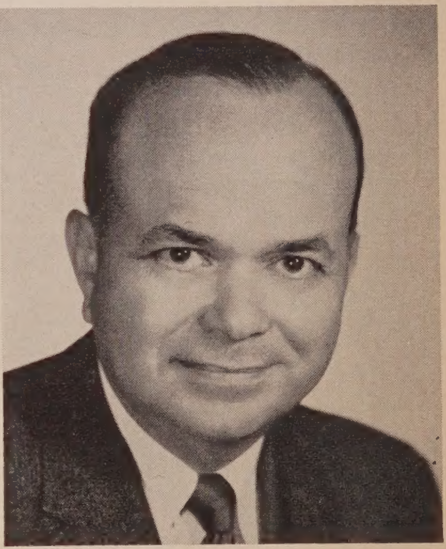
James H. Foote, vice president of Commonwealth Services, has received the American Standard Association's Howard Coonley Medal for outstanding service to national economy through promotion of voluntary standards.

United Illuminating Co. has announced the reassignment of two officers: **A. Royal Wood,** vice president and treasurer, has become secretary also; and **John M. C. Betts,** vice president and former secretary, has been redesignated vice president-employee and public relations.

Donald J. Gray has been named management consultant for Mississippi Power & Light Co. He joins the company from the Masonite Corp.

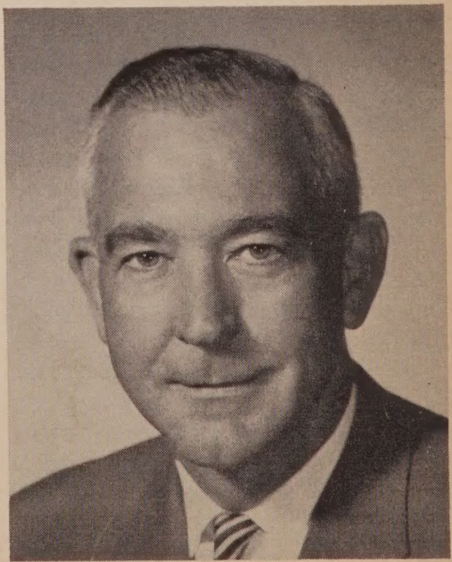
Announce Appointments

(Continued from page 95)



L. H. Oppenheim

Mr. Matthias is manager of heavy construction of Kaiser Engineers. Before joining the company earlier this year, he was chief engineer and director of engineering and construction for Aluminum Co. of Canada, Ltd., and was responsible for the $150-million Chute-des-passes hydroelectric project in Quebec.



F. T. Matthias

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1, 3, 6, 12 and 25 amperes;
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